Part II: County Model Investments

Introduction

By its nature the county model program offers relatively small investments (averaging $1,387 per participant) for traditional and diverse farming practices. Approximately $100,000,000 was invested by the Agricultural Development Board (ADB) in model programs representing more than 72,000 individual investments. Producers invested at least an equal amount to that invested by the ADB and in most cases much more than the required 50% match. Therefore, total combined investments in model programs exceed $200,000,000. However, exact figures were not available for this report. Some of the investments by producers include the purchase of other farm products from local producers and the purchase of equipment and supplies from local dealers. Therefore, most of the investments help to stimulate the local economy, substantially increasing the actual benefits beyond the initial investments. Most of these investments will continue to provide benefits well beyond the initial benefits stated in this report. Average investments by participants for specific programs above the required match will be reported below, where available.

Not all counties offered all programs; however, most producers are diversified and can usually find other programs in which they can participate. During a personal communication with a swine producer, the producer indicated that the swine program was not offered in his county. However, he felt that the county council was justified in not offering that program, since he is the only commercial swine producer in that county. He was able to participate in other programs.

This county model program evaluation is divided into four groups:

- Major Model Programs
- Diversification Programs
- Other Model Programs
- Shared Use Equipment Program

Major model programs include the top four programs in terms of money invested:

- Forage Improvement and Utilization
- Cattle Genetics Improvement
- Cattle Handling Facilities
- Hay, Straw, and Commodity Storage

These top four programs represent 78% of total county model program participants and account for 72% of the money invested. Investments averaged $1,284 per participant (Table 39).

Diversification programs were designed to encourage diversification of farming operations. One program, Agricultural Diversification, is further subdivided into 13 investment areas. They include:

- Agri-tourism
- Commercial Aquaculture Production
- Certified/Commercial Kitchen Construction or Renovation
- Direct-to-Consumer Livestock Production
- Equine Production
- Commercial Fruit and Sweet Sorghum Production
- Greenhouse Construction or Conversion for Horticultural Enterprises
- Small Animal Production
  - Honeybees
  - Rabbits
- Production of Commercial Ornamental Horticultural Products
- Poultry Production - Pastured/Other Fowl
- Commercial Vegetable, Mushroom and Herb Production
- Sod Production

Four other diversification programs are administered under separate program headings:

- Commercial Poultry
- Dairy Diversification
- Goat and Sheep Diversification
- Swine Diversification

Diversification programs utilized $16,561,283 (17%) of the total investments in county model programs with 10,069 (14%) participants averaging $1,645 per cost-share program.

The remaining four "other model programs" are:

- Farm Livestock Fencing Improvement
- On-farm Water Enhancement
- Technology
- Timber Production, Utilization and Marketing

These four programs accounted for $11,232,926 (11%) in expenditures for 6,044 participants (8%) with cost-share projects averaging $1,859 per award.

The Shared-use Equipment Program is significantly different from other county model programs, because it is designed to benefit multiple producers by providing equipment for loan. Benefits may include access to previously inaccessible land, improved crop stands, performance, and efficiency. Counties reported the loan fee for shared-use equipment has generated enough revenue to

Table 39: *Model Programs Statistics, 2001–2007.*

	Investments	Participants	Average/ Participant	Investment Distribution	Rank	Participant Distribution	Rank	Counties
Forage Improvement and Utilization	$21,467,255	17,496	$1,226	21.52%	1	24.25%	1	103
Cattle-Handling Facilities	$19,516,463	15,073	$1,294	19.57%	2	20.89%	3	101
Cattle Genetics Improvement	$11,910,751	16,602	$717	11.94%	4	23.01%	2	104
Hay, Straw, and Commodity Storage	$19,061,126	6,867	$2,775	19.11%	3	9.52%	4	99
Diversification Programs								
Agricultural Diversification	$11,840,156	5,312	$2,228	11.87%	5	7.36%	5	97
Commercial Poultry Diversification	$114,783	35	$3,279	0.12%	11	0.05%	11	4
Dairy Diversification	$1,235,060	411	$3,250	1.24%	9	0.57%	10	29
Goat and Sheep Diversification	$3,323,766	4,294	$774	3.33%	7	5.95%	7	89
Swine Diversification	$47,516	17	$2,795	0.05%	13	0.02%	13	8
Other Programs								
Farm Livestock Fencing Improvement	$8,813,429	4,674	$1,885	8.84%	6	6.48%	6	67
On-Farm Water Enhancement	$1,477,187	771	$1,915	1.48%	8	1.07%	8	23
Technology	$832,142	563	$1,478	0.83%	10	0.78%	9	28
Timber Production and Marketing	$110,165	36	$3,060	0.11%	12	0.05%	11	7
Total	**$99,749,805**	**72,151**	**$1,386**					

maintain equipment, replace the original equipment, or purchase additional shared-use equipment. Producers who borrow or rent the equipment are able to achieve similar results to larger producers who can justify the cost of efficient equipment.

Analysis

Data originated from model program reports from producer and were submitted electronically with assistance from county agricultural agents and administrators. Reports were filed with the Governors Office of Agricultural Policy (GOAP) by county administrators. Representatives from GOAP generated databases in Microsoft Excel with columnar headings for reported items or answers to questions. The model program review team solicited databases for each model program from GOAP for analysis. Databases were not inclusive of all cost-share items. Reports were not required initially by ADB, and therefore baseline production data were not established. Additionally, reports do not represent all cost-share participation. Available data were considered to be subsets and a representative sample of all projects for the purposes of this analysis. Databases with fewer than seven reports were considered too small for accurate interpretation and inferences were not made from that data.

For this report, a participant represented a single farm or farmer that participated in a specific program. A producer or farm may have participated in a single program multiple times or in one or more programs (there are limitations imposed at the state and county levels regarding participation in specific programs). A central theme at the county level has been to distribute available funds to as many producers as possible. County guidelines tend to be stricter than state guidelines, but counties cannot exceed maximum limits imposed at the state level. Participant responses to certain questions on program reports were thought to be artificially skewed due to prior participation in the county model programs. Reporting forms contain many questions that require participants to interpret the question. Dropdown menus on reporting spreadsheets might eliminate varied and difficult to interpret responses.

Attempts were made to resolve all data issues. Data issues included:

- duplicate data
- data listed under the wrong heading
- databases with some data points misaligned with headings
- data listed as a range rather than a specific number (e.g. 50-70)
- data with a plus (e.g. 50+) or other qualifier (e.g. give or take, millions, M, K)
- data reported on the wrong form
- data provided in the wrong database
- data reported in different units under a single heading

Databases from the four major model programs and some other programs were extensive and required many hours to resolve data issues before analysis. Databases for programs with less participation required an average of two hours of preparation prior to evaluation. All data issues that could not be resolved were dropped from the analysis. All duplicate data were removed. Data listed under the wrong headings were shifted into the correct column, if the appropriate column could be determined with 100% certainty. In some cases entire blocks of data were shifted into the appropriate column. In these cases, multiple columns of data were compared before the data sets were moved. Data listed as a range (e.g. 40–70 lbs) by producers were converted to a quantitative number by averaging the range. In the example given, an average of the range would be 55.

The county model program reporting forms utilize spreadsheets for ease of reporting. These forms have questions that require the input of financial data. Cells under such questions were commonly formatted in the reporting forms as financial data. However, the financial format displays cells with a "$" sign at the far left of each cell and a "-" at the far right. Unfortunately, cells left blank are analyzed by Excels statistical functions as a "0". If these cells were not removed manually the resulting averages were artificially low due to averaging 0s in with actual data. The currency format does not represent data as a "0" when using statistical functions and should be used in place of the financial formatting for ease of analysis. Reconciling these types of data issues required reformatting large amounts of data or deleting all occurrences of the missing data so that 0s would not be averaged in with actual data.

In most cases, data reported on the wrong form was non-usable and was discarded. For example, record management software purchased through the technology program was reported on the precision agriculture reporting form in some cases and could not be reconciled. Data provided in the wrong database were checked to see if it matched reports in the correct database. If a match could be made, the report was moved to the correct database. If a match could not be made, the data were dropped from the analysis. Care was taken to ensure that data imported to a database were not a duplicate of data already in the database.

Attempts were made to reconcile production data reported in multiple units. Reconciling data from multiple types of cropping systems was seldom successful. For example, production levels reported under the commercial fruit and sweet sorghum investment area of the agricultural diversification program contained several different units and crops, rendering analysis unproductive. However, production data from a single crop where data were listed in multiple units were normalized where possible. For example, honey data were reported in gallons, pounds and cases. Data were normalized to pounds by converting gallons and cases to pounds using standard conversion factors.

Expert Groups: Focus Group, Ag Agent Group, Specialists

In this part of the ADB evaluation effort, there were three different Expert Group meetings to analyze performance and discuss implications (specific information on each is included in the appendices):

- **Focus Group**–To evaluate the impact of the major model programs and to examine suitability of questions on reporting forms, an expert focus group was assembled that included county council members, producers, Extension agricultural agents, University of Kentucky Extension Specialists and Associates, and Kentucky State University Specialists. Following introductions, each attendee was given a booklet containing the reporting questions for each model program or investment area. Statistics and data for each major model program were examined and reviewed by the group (data for other model programs were not available at that time). Thoughts, suggestions, and recommendations were recorded and booklets with group members comments were collected for review. Focus group suggestions were incorporated, where appropriate, in this document.
- **Agricultural Extension Agent Group**–An agricultural agents group meeting was called on September 8, 2008 to further evaluate the reporting system and the questions asked on reporting forms. Agents were selected based on experience and their countys participation in model programs.
- **Expert Interviews and Consultations**–Data generated from analysis of various model program reports were shown to experts for interpretation and evaluation of benefit. Experts are recognized for their contribution where appropriate. Many agents were also consulted on various aspects of the model programs data.

Data Collection and Reporting–Conclusions and Recommendations

A central theme from focus group participants was the need to streamline the reporting system to improve future impact assessment, reduce producer burden, and reduce administrative demand for logging data. A main concept of the Agricultural Development Program (ADP) is to improve producer efficiency and record keeping. Streamlining the reporting system fits that premise. Although initial report forms were designed to generate baseline data, some responses to questions confirm what we already know, do not generate the responses expected, may be easily misinterpreted by those filling out the forms, or may generate such a wide range of responses that tabulation is impossible. Since reports came after the initial launch of the ADF, producers reporting previous practices may indicate an improved practice rather than a practice used prior to availability of ADF. This skews data upward, reducing the ability to assess actual impact. At this point there is no longer a need to generate baseline data from the reporting system. However, there is a need to fine-tune questions to improve impact assessment and to eliminate questions that do not generate useful data.

The social security and tax identification numbers listed on report forms pose security issues and should not be requested. This issue was raised on several occasions by focus groups and

individuals. Reports of identity theft are prevalent and participants have concerns about providing their personal ID numbers. Producers provide their tax ID at other times, which should be sufficient for tax purposes.

Some common questions included on most reporting forms may provide little benefit. Some questions (such as farm size) appear in all reports and generate averages that are expected, but are not useful for assessing cost-share benefit. Focus group members felt that asking the farm size did not add to the report and could be eliminated to streamline reporting. Although most cost-share programs asked the number of acres in the farm, not all did. Inclusion of data from a large farm on a database containing mostly smaller farms can skew acreage data to an unrealistically high average.

Participants are asked if they would have invested without cost-share support, but there is no indication if those that answered yes would have invested at the same level as they did with the cost-share funds. The high positive responses to this question were suspect due to producer perception that a positive response would indicate commitment to the project.

Answers to questions regarding production levels and yields were often too variable and reported in varying units. Such data were difficult, if not impossible, to analyze. Before and after questions on reporting forms should occur together so that comparisons during analysis are easier. Following a question with a fill-in-the-blank area tends to leave too much room for individual interpretation and inconsistent data. Multiple choice answers are encouraged where possible to indicate the range of answers sought. Dropdown menus for questions with multiple options would help improve recording efficiency in Microsoft spreadsheets. This would generate uniform answers, reducing errors that interfere with analysis, such as spelling errors or variable forms of the same answer. Reports often contained data reported in multiple units. Some indication as to the unit of measure expected for each question would improve data consistency and therefore analysis results.

Major Model Programs

The ADB established county model programs upon recognition of significant trends among initial county applications for ADF. Model programs promote efficiency, decrease "red tape", and develop leadership capacity within local organizations that assume responsibility for program administration. State guidelines establish consistency and funding standards within counties distributing funds to address statewide needs in identified investment areas.

To date, 14 county model programs have been launched and remain available. The first county model program began in March 2001 with producers participating in Cattle Genetics Improvement. Farmers participating in the program are required to provide at least a dollar-for-dollar match, thereby leveraging agricultural development funds by 100% or more. Another model program, Agricultural Diversification, is further subdivided into 13 investment areas. Nearly $100 million of ADF have been invested into county model programs through 2007. From these 14 model programs, four have emerged as "major" model programs. They represent 72% of model program investments and 78% of model program participants. All are based on the livestock industry and the forage/feed foundation upon which the industry relies. The level of investment should

come as no surprise, as livestock represented 64% of Kentuckys agricultural cash receipts in 2001 (68% in 2006, Kentucky Agricultural Statistics and Annual Report data).

Each major program was examined separately. The program goals were revisited; program impacts and adherence to ADB investment objectives were evaluated; and conclusions and recommendations, including changes to future reporting requirements, were provided.

Table 40: *Major model program investments and participants.*

Program	**Investment**	**Participants**
Cattle Genetics Improvement	$12 Million	16,602
Cattle Handling Facilities	$19.5 Million	15,073
Forage Improvement and Utilization	$21.5 Million	17,496
Hay, Straw, and Commodity Storage	$19 Million	6,867

Forage Improvement and Utilization Program

(Established March 2001, Updated November 2007)

Eligible Cost-share Items—Forage/Pasture Development; pasture/grain improvement; filter fabric pads for heavy use areas; fence and water for rotational grazing systems; subsurface drainage; custom seeding and seeding equipment rental.

Program Goals—Improve net farm income through improved forage quality, quantity, and efficient use; encourage science-based decisions on forage management and forage resource development on the farm; impact a high number of forage producers; change producer attitudes about forage management.

The ADB expected eligible cost-share items to accomplish several objectives:

- Decrease production costs associated with fungal endophyte in tall fescue
- Improve forage establishment practices
- Increase use of certified, plant variety protected, and proprietary forage varieties
- Provide essential nutrients for pasture and grain crops based upon nutrient management plans to save money and protect water quality
- Decrease losses due to mud and outside hay storage
- Enhance hay utilization
- Improve pasture utilization through rotational grazing
- Improve soil drainage to accommodate higher quality forage/feed production
- Facilitate custom seeding if needed for forage/grain crop improvement

Analysis of Impact—Investments in Forage Improvement and Utilization (forage program) adhere to several ADB objectives. The significance of livestock revenue to Kentuckys agricultural cash receipts has been stated. Forage and feed crops are the foundation of Kentuckys livestock industry. Improvement and enhanced utilization of these resources build competitiveness in a firmly established agricultural sector. Participation also allows producers to access emerging (cash hay) and value-added (Certified Preconditioned for Health, CPH-45) markets.

Seventeen thousand four hundred ninety-six producers have participated in the forage program—more than any other model program. Reflective of Kentuckys status as the largest cattle-producing state east of the Mississippi River, a significant number (89%) produce beef cattle. Since nearly 70% of beef cattle producers raise(d) tobacco (Burris, Laurent, Bertram, Absher), the program may benefit over 10,000 tobacco producers by improving net farm income in an enterprise other than tobacco. Interestingly, the data indicate beef producers participating in the program have herds that average twice the state average herd size.

Additional ADB investment objectives are addressed by the forage program. Local leadership capacity is enhanced within the organizations accepting responsibility for administering program funds. Environmental stewardship is promoted through establishment and maintenance of vigorous, healthy forage crops, which control soil erosion and reduce runoff pollution of surface and ground water. The program also provides educational opportunities for Kentucky producers through orientation sessions and demonstrations facilitated by the Cooperative Extension Service (CES).

Economic impacts of the forage program can be estimated in several areas. More precise evaluation should be possible in the future if recommendations for reporting improvements are incorporated. Because the evaluation is based on limited data obtained after the program had been in operation, it reflects a "snapshot" of overall program impact.

As described in the introduction to model investments, there is ample reason to believe some responses may be skewed due to prior program participation. For example, more than half provided information from soil tests; however, according to UK College of Agriculture specialists, less than 10% of Kentucky forage land is soil tested (Lacefield, Henning, Smith).

Fortunately, this demonstrable practice change indicates another successful educational component (required soil tests) of the forage program. For those producers who obtain soil test recommendations, there is support for the application of up to 230 pounds of actual nitrogen, split among three application windows (late winter, late spring, midsummer), to cool-season grass stands. The majority of Kentuckys forage base is fescue, a cool-season grass infected with a production-limiting fungal endophyte. Renovation of grass pastures and hayfields with legumes provides nitrogen through fixation, reducing the need for nitrogen fertilizer. One quarter of participants indicated they were renovating pastures, encompassing 11,739 acres. It can be assumed they would otherwise have applied 100 pounds of nitrogen per acre at $0.75/pound, in two split custom applications ($4.50/acre/application), and the benefit lasts three years (average life of a clover stand). Fertilizer and fuel savings from renovation should be almost $3 million according to this scenario.

The improvement in forage quality as a result of renovation may increase net farm income as well. Participants indicated roughly equivalent acreages of hay and pasture improvement plans. For the following analysis, it was assumed that approximately 5,000 acres of each were renovated.

Pasture—Higher quality grazing provided by improved (renovated with red clover) pastures improves profitability through higher weaning weights and increased conception rates. Returns calculated by UK specialists (Burdine, Eldridge, Trimble) can be $31/acre/year, or $93/acre over three years, representing an increase of nearly half a million dollars in farm income for program participants in this time frame.

Hay—The improvement in yield and quality of hay produced from hayfields through renovation with red clover may increase income by $270/acre over a three year period (Burdine, Smith, Trimble). This increased hay value represents $1.35 million from 5,000 acres.

Another indication that reporting responses may be influenced by previous program participation is the high number of producers (94%) who claimed to "... usually seed an improved or certified variety ...". The forage program will cost-share only certified, plant variety protected, or proprietary forage varieties recommended in the Seed List. Although UK specialists are skeptical that such a high percentage of improved varieties are utilized without such a requirement, this response indicates a profitable practice change.

Over half (59%) of the respondents indicated hay improvement as an objective for forage program participation. If half of those respondents seeded improved varieties of alfalfa or red clover, they may see an average extra value of $400/acre over the life of the stands (Jimmy Henning, personal communication). Based upon the reported hay acreage (22,863), this represents $2.7 million in additional income or value.

Replacing endophyte-infected fescue with novel-endophyte (stand life 10 years) or endophyte-free (stand life five years) fescue increases the pounds of weaned calf per cow. Increases are primarily due to higher conception rates and weaning weights. The benefit per acre is $44 (Kenny Burdine, personal communication); assuming 10% of the pasture acreage seeded (24,094) went to each replacement strategy, an increase in income of $1.5 million may be realized.

Evidence of impact on some first-time forage program participants is found in the fact that one-fifth of respondents indicated this was the first time the land has been limed. Average soil pH was reported to be 5.9, too low (acidic) to support vigorous forage growth (especially legumes). UK recommends a target pH of 6.4 (6.8 for alfalfa) for optimal yield and stand persistence. For example, proper liming can enhance clover yield 25% and add a year to stand longevity (Ray Smith, personal communication).

The requirement to soil test and apply needed lime and nutrients to nearly 50,000 acres of Kentuckys forage base should significantly boost income and forage quality for the 1,431 producers reporting on this stage of the program.

Increased participation (fivefold from 2000 – 2006) in CPH-45 sales has been identified in Part I of this report as representing an estimated additional $1.35 million of income annually for Kentucky beef producers. Certainly, an improved forage base contributes capacity to retain calves and capture these value-added premiums.

Data from participants in the filter fabric, fence and water, tiling, and custom seeding components of the forage program was limited. No evaluation of those activities was attempted.

Conclusions—The forage program has resulted in additional net farm income for participants, as reflected by numerous examples. Science-based decisions (soil testing, renovation, improved seed varieties) in forage management have increased through program participation. A high number of forage producers have realized economic benefits and adopted best management practices in their forage operations. Report form revisions will aid future analysis of program impact.

Recommendations—*Forage/Pasture/Grain Improvement–To better evaluate economic impact, the seed type should be broken into five categories: cool-season grass, cool-season grass and alfalfa,*

cool-season grass and clover, warm-season perennial, and small grain/row crops. The livestock type with average herd size, varieties sown, and the type of livestock fed should be dropped from the application. "Do you usually seed an improved or certified variety like this one" should be changed to "Did you seed with an improved or certified variety like this one before this program?" The option of "grazing" should be added to the question of how this forage is primarily used, and "renovate grass pasture" should be changed to "renovate grass stands with legumes." There should be four categories in determining the number of square bales and roll bales sold annually: mixed, alfalfa/alfalfa mixed, clover/clover mixed, and grass. The total number of acres before seeding should be dropped. The buffer pH should be dropped as it only confuses the applicant. The option of "cash hay" in the primary use of land should be changed to "hay". The type of row crop, seed type if cash hay or pasture, land that is being limed for the first time, and annual sales of crop or hay should be removed. Since they are required to obtain a soil test before liming, it would be good to know the number of people who didnt previously soil test. The question "Did you previously soil test before participating in this program?" should be added.

Filter Fabric Pads–The average herd size should be removed from 5e as it is asked in the question with the type of livestock that will be impacted (2b). The type of new heavy use area should have only options of feeding area, gate or high traffic area, and forage storage. The option of "other" needs to be omitted as it only causes reporting errors and a large number of different responses that are difficult to evaluate. The question of how many bales a storage area holds should be "If for forage storage, how many bales storage area holds?" Options should distinguish small round, large round, and small square bales. Use a size of 4x5 or less than 1,100 lbs. for a small round bale and a size of 5x5 or greater than 1,200 lbs. for a large round bale. The type of hay storage structure and size of structure should be removed.

Fence and Water (Rotational Grazing)–Rotational grazing plans are being somewhat overlooked in the application process and can be removed. The number of pasture acres is not specific enough, creates confusion in the reporting process, and yields a number of different answers that are difficult to evaluate. The forage species to be grazed rotationally and numbering of watering points available before practice should be dropped. "Type(s) of livestock that will be impacted and average herd size" should be changed to "Type(s) of livestock that will be impacted and stocking rate before and after practice." Eliminate the two following questions pertaining to stocking rate. Other savings anticipated is more than likely an educated guess by the applicant, is reported in different units, and should be removed.

Subsurface Drainage–The only valuable data in the economic/impact information section is the primary use of tiled land and expected gain in yield as a result of proper drainage. All other questions can be removed from the report.

Participation in components of the program other than forage/pasture/grain improvement has been limited (fewer than 10% of program participants in any of the other cost-share areas). Increased publicity/educational sessions addressing production losses due to mud, poor soil drainage limitations to crop production, benefits of rotational grazing, etc. may increase utilization of these program features.

Fewer than five percent of respondents indicated pursuit of cash hay sales. Promotion of existing market assistance for cash hay sales (hay auctions, Kentucky Department of Agriculture hay website and hotline, etc.) may increase producer participation in the cash hay market.

Cattle Genetics Improvement Program

(Established February 2001, Updated November 2007)

Eligible Cost-share Items—Bull purchase or lease and semen purchase; artificial insemination (AI); heifer purchases.

Program Goals—The Cattle Genetics Improvement Program (genetics program) aims to increase cattle producers net income through improvement of herd genetic potential. This improvement is based upon the use of Expected Progeny Differences (EPDs) in selection of breeding animals. EPDs are indicators of the genetic worth of an individual animal as a parent when compared to another animal of the same breed according to the UK Extension publication "Using EPDs – Expected Progeny Differences" (ASC-141).

The ADB expected eligible cost-share items to be used to accomplish several objectives:

- Increase net farm income through genetically superior animals
- Improve producers ability to use science-based approaches to selection of breeding stock
- Facilitate use of artificial insemination to reduce costs associated with bull maintenance and realize productivity gains
- Ensure retention of quality breeding stock long enough to realize benefits to herd genetics

Analysis of Impact—The genetics program was the first model program approved by the ADB. During the review period, 16,602 farmers participated, and a majority likely raised tobacco at some point (Burris, Laurent, Bertram, Absher). Local agencies (often local Cattlemens Associations) developed leadership skills through administration of the program, including reporting accomplishments.

Educational opportunities and resultant profitable practice changes are a major benefit of the genetics program. Baseline data obtained before the advent of ADB model investments (Burris, Laurent, Bertram, Absher) indicate that among typical Kentucky cow-calf producers, reproductive soundness ranked fifth and genetic predictors (EPDs) ranked eighth as most important factors when selecting herd bulls.

Reports from the genetics program (which are likely affected by previous program participation or awareness of program requirements) reflect that 67% of participants previously used EPDs. In addition, Breeding Soundness Evaluations (BSEs) are required for all bulls purchased or leased through the program. Prior BSEs were reported by 65% of participants, again likely inflated over baseline data due to program participation/awareness. Since 89% of participants purchased bulls, a significant economic impact should result from educating producers to tailor sire selection to their operations and marketing plans and to ensure reproductive efficiency of herd bulls before the breeding season commences. The average herd size reported included 60 cows and two bulls; bulls covered an average of 29 cows – a reasonable expectation for sound, established sires.

Responses on genetics program report forms indicated 55% of producers intended to breed heifers to purchased bulls, and 75% planned to retain heifers from purchased bulls. The inclusion of

a "Heifer Acceptable Bulls" category, based primarily on calving ease/birth weight EPDs should, among other advantages, reduce losses due to calving difficulties (dystocia). Dystocia leads to estimated losses of $750 million annually to the cattle industry (UK Extension publication "Pelvic Measurements and Calving Difficulty", ASC-142).

CPH-45 market participation among program respondents was 11%, more than double the statewide average (5%). Producers receive an average $40.95 per head premium annually through participation in these value-added feeder calf sales, according to the Kentucky Beef Network.

While AI provides numerous benefits (increased production, enhanced conception rates after parturition, breeding program flexibility), reports show the percentage of producers accessing the AI component to be only slightly above the state average (Darrh Bullock, personal communication). Most participants who cost-shared AI expenses were either purebred or commercial producers with previous AI experience.

The genetics program increased demand for quality bulls and consequently inflated prices. Part of the reason for the high percentage of participants bull purchases may be linked to the resale value of the bull. While participants must retain ownership of breeding animals through at least two breeding seasons, most will replace bulls quickly afterward due to breeding programs, lack of facilities to manage multiple bulls, The program limits producers to a lifetime maximum participation of $10,000 ($5,000 each for bull/semen and heifer purchases).

Conclusions—Nearly 15,000 bulls were purchased as a result of the genetics program. These animals were selected using the science-based approach of EPD data to match producers management and marketing systems. Increases in net income through genetic improvement of herds can be attributed to: improved breeding programs, increased calving percentage, decreased losses due to dystocia and other health problems, value-added market participation. Report form revisions will aid future analysis of program impact.

Recommendations—Genetics (Beef Production)–The date of purchase and age of animal at purchase serves no purpose on the report. The type of bull chosen in the initial application is irrelevant to what was actually purchased and the question should be removed. The information on EPDs is already on the registration/certification papers and contains no data valuable to the report. The option on the type of operation should be changed from "purebred" to "registered". The answers relative to using EPD information in sire selection is probably skewed due to previous involvement in the program and can be removed. "Estimated number of cows that will be covered by cost-share bull" should read "Estimated number of cows that will be covered annually by cost-share bull." Questions pertaining to bull being bred to heifers; retention of heifers from bull; marketing of calves sired from bull; and previous breeding soundness evaluation are not useful to evaluate impact and should be eliminated. The question pertaining to calving season should be omitted as it provides no useful information. The question of how the participant previously purchased the bulls should be asked "Before this program where did you purchase your bulls?" Options include stockyard; purebred producers; and special sale. The average cost per straw and previous AI breeding can be removed.

Genetics (Dairy Production)–The number of bulls in the herd and estimated number of cows that will be covered by the cost-share bull are the only useful questions in the dairy production section. The data from the average cost per straw, AI breeding in the past, retention of heifers, and marketing of calves are irrelevant to the report and should be removed.

Heifer Improvement–Age of animal at purchase, EPD type purchased, and the type of bull chosen in the initial application do not provide usable data and should be removed. The number of bulls in herd, marketing strategy of calves from these heifers, and calving season in beef and dairy production should be dropped. The option on the type of operation should be changed from "purebred" to "registered" for both dairy and beef production.

Sustainability of herd genetic improvement may be challenged by lifetime maximum participation levels. Inflated costs of quality bulls may result in producer regression to purchases of inferior breeding stock. The advantages of improved replacement heifers to breeding programs may not be realized until three to four years into their reproductive careers, and producers are limited to two heifers per season.

The ADB should consider increasing caps to ensure maximum statewide gains due to genetic improvement. It is unclear why producers are limited to two heifers per season. Consideration should be made for allowing producers to purchase more than two up to the dollar limit.

The advantages of AI are not being fully exploited by program participants. An educational component emphasizing AI benefits, AI training support, and custom AI services may increase participation.

Cattle Handling Facilities Program

(Established June 2001, Updated November 2007)

Eligible Cost-share Items—Handling facilities and equipment for beef cattle; secure lot or pen for mature beef bulls; pens for weaning calves; handling facilities and equipment for dairy cattle; temporary or permanent shade.

Program Goals Improve net farm income through improved cattle corrals and handling facilities for beef and dairy cattle to allow for best management and health practices that augment efficient production and marketing opportunities; encourage science-based decisions on cattle management, handling and health programs on the farm; impact a high number of beef and dairy producers; minimize animal and human injury and stress during treatment and handling operations; change producer attitudes about cattle management and handling.

The ADB expected eligible cost-share items to accomplish several objectives:

- Enable beef cattle producers to conduct necessary health care and management practices
- Encourage control of herd bull(s), improve bull health/fertility, and facilitate a controlled and defined breeding season
- Improve management at weaning to decrease stress on calves
- Increase profitability of dairy operations by facilitating health care and management practices
- Establish temporary or permanent shade solutions to reduce heat stress on animals

Analysis of Impact—The Cattle Handling Facilities Program (facilities program) also builds competitiveness within Kentuckys livestock industry. Improved cattle handling facilities should improve

net farm income, especially by decreasing labor costs. The most important benefit, however, is the reduction of injuries to workers and animals according to the UK Extension publication "Cattle Handling Facilities: Planning, Construction, and Layouts" (AEN-82).

Agriculture is one of the most dangerous occupations in the US. Most injury prevention efforts focus on tractors and other machinery, but according to national statistics livestock account for 19% of farm injuries (tractors are involved in 6%, other machinery in 15%; Isaacs, Powers, Lineberry, Scharf).

One thousand two hundred and five Kentucky Cattlemens Association members responded to a 2001 survey on cattle-related injuries. They reported a total of 170 injuries in the previous year—a rate of 14.1 injured persons per farm per year. Half of the injuries described were due to workers being kicked or run over by cattle, and a third required medical attention or led to more than four hours of missed work (Browning, Westneat, Davis).

One northern Kentucky producer reported sustaining a broken leg while working cattle; the resulting medical bills exceeded $5,000 (Sam McNeill, personal communication). Construction or improvement of cattle handling facilities may save Kentucky producers significant money through reduction of both medical expenses and lost worker time due to injuries.

Proper working facilities benefit herd health through reduction of stress and injury. Animal stress can lead to weight loss, increased susceptibility to disease, and other related performance problems. Bruising and injuries resulting from improper handling are quality defects. Stress-related problems can reduce farm income and generate an inferior end product. Members of the Kentucky Veterinary Medical Associations Executive Board who practice large animal medicine state that the new equipment has been very beneficial for them in treating the cattle on the farm, and think the program is beneficial in providing more safety while handling livestock (Louise Cook, personal communication).

The facilities program has reached a large number of Kentucky producers (15,073). As with the forage program, most raise beef cattle (of 2,087 reporting, 92% had beef cows, heifers, or stockers). Since a majority of beef producers also raised tobacco at some point, a significant number of tobacco-dependent operations are participating.

Educational sessions and demonstrations provide training opportunities for cattle producers participating in this program. Local agency personnel administering the funds increase leadership capacity within their communities. The health, safety, and welfare of human and animal populations is improved as modern, efficient cattle handling facilities come online throughout the state.

Economic impacts of the facilities program should be realized through returns to the participating operations, especially through labor savings. AEN-82 compares returns over variable costs per head for cow-calf operations with and without a $5,000 investment in handling facilities. Facilities increased returns more than $20/head, primarily through increases in calving percentage and weaning weights and decreases in death losses for calves and breeding stock. Participants reported an average herd size (beef cows, 51% of respondents) of 50 head on over 1,000 farms. Based on increased returns of $20/head, they could realize an additional $1 million in income.

Proper handling facilities enable producers to efficiently perform health care and management chores that are proven moneymakers. Analysis of some individual economic impacts due to specific tasks will come later.

Perhaps the most significant economic effect of this program is facilitation of producer participation in value-added markets. CPH-45 sales in Kentucky historically yield premiums to farmers who meet health care and management requirements while preconditioning feeder calves for solid feedlot performance. When asked about CPH-45 sale participation, 68% indicated previous participation and 86% planned participation after installing facilities. The actual number indicating plans to participate more than doubled the number previously participating. The baseline for responses may be inflated due to previous facilities program participation. An earlier survey of cow-calf producers conducted prior to ADB Model Investments ("baseline survey"; Burris, Laurent, Bertram, Absher) indicated only 10% participated in graded calf sales. This may indicate a milestone in educational success regarding value-added marketing. If it is assumed that 90% of the 1,057 cow-calf producers responding marketed an average of 35 calves in CPH-45 sales as reported, then based upon the $40.95/head premium estimated by the Kentucky Beef Network this would amount to $1.36 million in farm income attributable to value-added marketing.

Facilities program producer reports tabulated data on health care and management practices. The chart contains information from the baseline survey, as well as facility program participants previous and planned practices.

Table 41: *Percentage of respondents involved in cow health care and management practices.*

Practice	**Baseline survey (%)**	**Before program (%)**	**After program (%)**
Vaccinate cows	75	73	91
Vaccinate calves	94	83	96
Pregnancy check	25	44	60
ID calves	61	69	93
Separate bulls/cows	60	66	79
Castrate male calves	77	79	92
Implant growth stim.	–	34	50
Retain weaned calves	–	67	81

A significant improvement in intentions to identify calves is an important contribution to the $720,000 of additional annual income generated through Process Verified Program (PVP) sales (mentioned in the Non-Model Investments discussion, requires animal ID). Animal identification provides numerous additional benefits beyond market access (recordkeeping, disease control, emergency management, etc).

In four of six responses to questions common to the baseline survey and program reports, there was an increase in profitable practices, implying progress – possibly due to previous program participation. More striking is the improvement shown in planned vs. current practices from producer reports. All show double-digit gains, ranging from 13–24%. According to UK Extension Ruminant Veterinarian Patty Scharko, these practices are profitable for farmers. Pregnancy checking and culling open cows can have an annual net value of $235. Implanting growth stimulant can

add $24/head and internal parasite control (also easier with handling facilities) adds $17/head net value.

It should be noted that all annual economic benefits from the facilities program should recur for at least 10 years (potentially many more) due to the useful life expectancy of the equipment and structures acquired through cost-share.

Over one-fifth of respondents indicated their herds calved year-round. The secure lot/pen for mature beef bulls component of the facilities program provides a tool for defining and controlling the calving season. Nearly 80% indicated plans to separate bulls from cows after program participation, up from 60% in the baseline survey. Labor savings represent a significant economic impact of the program; a defined calving season will allow producers to work calves together, amplifying efficiency and labor cost savings. Uniform lots of calves also capture market premiums.

Data on weaning pens, dairy facilities, and shade structures was limited and no analysis was attempted of those program components.

Conclusions—The facilities program increased net incomes for a high number of cattle producers (primarily beef producers) through labor savings, reduction of medical expenses and lost work time, improved herd health and productivity, and access to value-added markets. The ability to adopt/enhance science-based management and health care practices are facilitated by the cost-share equipment and structures. Report form revisions should streamline program administration and aid analysis of impacts.

Recommendations—Project Information - Cow herd size information is good to know, but doesnt provide any real value for the report. The question pertaining to the identity of calves should be "Did you previously identify calves with tags, brands or tattoos?" The average weaning weight number is an educated guess since most farmers dont have access to scales at weaning, and this question needs to be removed. Remove question about selling calves at weaning. An option of "bulls" needs to be added to the question about the usual average selling weight of steers and heifers. The question, "How many calves do you normally sell?" inserted after the average selling weight question would be helpful. The question relating to participation in a CPH sale with the new equipment has already been asked. The question pertaining to calving season should be omitted as it provides no useful information.

Several farm safety experts indicated the ADB should consider implementing cattle-related injury prevention/general safety training sessions in conjunction with the facilities program. The importance of the benefits that the equipment provided through program participation (if properly utilized) can bestow upon human and animal health, safety, and welfare should be emphasized.

The benefit afforded by investment in long-lasting equipment perpetuates annual economic gains. The ADB should consider the sustainability contributed by similar durable investments in future model program decisions.

Hay, Straw, and Commodity Storage Program

(Established November 2002, Updated November 2007)

Eligible Cost-share Items—Hay and Straw Storage; hay handling equipment; commodity Storage.

Program Goals—Impact a high number of producers affected by loss of income resulting from cuts in tobacco quota; encourage farmers to improve practices related to hay, straw, and commodity utilization and storage; increase the quality of stored feed and efficiency of storage, which will increase hay value and animal gain/production; enable grain producers to implement marketing strategies to capture higher prices than available on the cash market at harvest; provide livestock producers the ability to utilize grain grown on the farm; allow livestock producers to invest in commodity or blended feed storage facilities.

The ADB expected eligible cost-share items to be used to accomplish several objectives:

- Maintain nutritional value of hay
- Provide opportunities to develop commercial hay sales
- Present opportunities for small grain producers to market straw
- Allow livestock producers to purchase commodities or blended rations in bulk at reduced prices
- Improve livestock weight gains through implementation or enhancement of feeding programs, resulting in higher net returns

Analysis of Impact—The Hay, Straw, and Commodity Storage Program (storage program) provided funding to nearly 7,000 participants during the review period. As with other major model programs, most participants (92%) produce beef cattle, implying assistance to a large number of tobacco growers.

Investments per participant ($2,800) were the highest among major model programs – more than double the closest, the Cattle Handling Facilities program ($1,300/award)Table 39. These two major model programs invest in equipment and structures that may remain in use for 10 – 20 years or more, providing benefits on a recurring basis to producers.

Educational sessions are required by the program, and encourage efficient investments in recommended structures and equipment. It is encouraging to note that some counties have offered safety training in conjunction with the hay handling equipment and grain storage components. As with the Cattle Handling Facilities program, it should be emphasized that the human safety impacts of proper utilization of these cost-share programs are significant. Local agency personnel build leadership capacity through administration of program funds, provision of educational support, ensuring producer compliance with program requirements, and reporting accomplishments.

For the time frame represented by report forms, the primary participation involved construction of hay storage structures. Approximately 1,000 structures with an average of 2,400 square feet of storage space and 15 feet of vertical clearance were constructed. According to UK specialists, this average space will accommodate 171 tons of square bales or 131 tons of round bales of hay.

The economic impact of storing hay inside a structure with a roof can be estimated by comparing losses with outside storage. UK research demonstrates that hay stored outside on the ground loses 30% dry matter per year, whereas hay stored under a roof only loses 5% dry matter (Kenny Burdine, personal communication). Therefore, a savings of 25% of hay value may be ascribed to inside hay storage.

Round bale storage was the objective for over 90% of respondents. Assuming 900 producers were able to protect 131 tons of grass or mixed hay each, at a value of $30/ton, total savings would be $884,250. If 100 farmers each sheltered 171 tons of square bales of alfalfa or other high value hay ($60/ton), annual income could increase by $256,500. The combined annual increase of $1.14 million may be realized for 20 years or more, depending upon useful life of the structures. Additionally, these prices reflect the current market according to UK specialists and agents, after a spring season with abundant rainfall. Recurring periods of drought (2007, fall 2008) may quickly decrease hay supplies, increasing demand and prices.

Only 3% (37 producers) of respondents indicated straw storage plans. Quality cereal straw, marketed to select end-users (horse industry, landscapers, construction), can sell for $80 to $120 per ton (UK New Crop Opportunities Center publication "Cereal Straw Production"). If the 37 producers each realized 25% savings due to inside storage of 171 square bales of straw worth $100/ton to these specialty markets, nearly $160,000 of additional annual income could be realized for 20 years or longer.

While these calculations represent gross returns, the significance of the savings means producers can recoup initial investments within two to three years. This means the savings due to structures will represent net income for more than 15 years. Both the grain and commodity storage components of the storage program attracted about 50 participants. While the data was difficult to quantify, most reported benefits including: capture of better market prices for stored grain, labor savings, lower prices for commodities purchased in bulk quantities, other annual savings or increased income.

Data on participation in the hay handling equipment component of the storage program was limited, and no analysis was attempted. Information on net returns based upon improved livestock performance resulting from program participation was likewise limited; it is inferred that some of the economic gains attributed to hay value may be realized through improved on-farm feeding programs and increased livestock production.

Conclusions—The storage program has allowed nearly 7,000 producers to improve farm income by: reducing hay/straw losses through inside storage, saving on feed costs by utilizing on-farm feed and purchasing bulk commodities, pursuing cash hay and straw markets, reducing labor costs associated with hay and grain handling. Report form revisions should streamline program administration and aid analysis of impacts.

Recommendations—The question pertaining to the type of storage should be "Investment Area/Type of Storage and/or equipment, circle all that apply," since there is the option of purchasing equipment. An option of hay and grain handling equipment should be provided for this question.

Hay or Straw Project–One form should be returned before receiving 100% of the payment instead of 90%. Some farmers dont fill out the form for 10% of the payment, and a single form creates less confusion and paperwork. Therefore, the subheading should be "Return this form before receiving 100% payment" and the second question should be "100% of cost-share request for this cost-share investment." The livestock type and average herd size should be removed. The type of structure, average annual yield, and annual bales harvested is good information to know, but does not contain any data useful to evaluation. Insert the options of large round and small round in the number of bales stored outside prior to structure. Use a size of 4x5 or less than 1100 lbs. for a

small round bale and a size of 5x5 or greater than 1200 lbs. for a large round bale. The options in the type of hay to be stored should be changed to grass, alfalfa, alfalfa/grass, clover, clover/grass, straw, and other, and also include the amount of hay to be stored. An option of small round needs to be added to the bale package to be stored in the new facility. The number of bales sold annually, selling price, expected feed savings, expected increase in hay or straw sales, and other expected yearly savings or added income should be removed. The form required before receiving 10% of the payment should be eliminated since most of the information can be determined from a single form.

Grain Project–A single form for 100% payment should be required as for the Hay or Straw Project, and the 10% payment form should be eliminated. The type of previous grain structure, size of previous grain structure, and existing grain storage capacity before cost-share should be removed, as the information needed concerns the new structure and the increase in storage capacity. The acres of grain harvested and average yields of grain should be removed.

Other Commodity Storage–A single form for 100% payment should be required as for the Hay or Straw Project, and the 10% payment form should be eliminated. The type of old commodity storage, dimensions of old commodity storage, yearly tonnage purchased before new structure, and estimated tons fed annually should be removed. Three questions need to be included on this report: How many tons of storage? How many tons will be stored annually? How much will be saved annually per ton?

Hay Handling Project–The title needs to read, "Hay and Grain Handling Project." A single form for 100% payment should be required as for the Hay or Straw Project, and the 10% payment form should be eliminated. This form should have the following questions.

- *What was the total project cost for this cost-share investment?*
- *Was 100% of cost-share requested for this cost-share investment?*
- *What equipment did you purchase?*
- *What savings realized through improvement (circle all that apply)?*
  - *Labor*
  - *Time*
  - *Efficiency*

Anecdotal evidence of safety training in two counties as part of this program reflects local leadership initiative through recognition of the significance of human safety. Safety education and the communication of safety benefits of the program should be emphasized as contributing and complementary to economic advances.

The long useful life of facilities established through this program amplifies the return on investment over many years. The ADB should consider the sustainability contributed by similar durable investments in future model program decisions.

Diversification Programs

Five programs were designated as diversification programs. They are Agricultural Diversification, Commercial Poultry, Dairy Diversification, Goat and Sheep Diversification, and Swine

Diversification. Diversification programs utilized $16,561,283 (17%) of the total investments in county model programs with 10,069 (14%) participants averaging $1,645 per cost-share program. Three of the programs, Commercial Poultry, Dairy, and Swine are stand alone programs and not included under Agricultural Diversification Programs. The Direct-to-consumer Livestock and the Poultry: Pastured and Other Fowl Programs attracted new producers to those types of businesses. Other programs may not have encouraged new producers to diversify into a different production area but promoted diversification in other ways, such as different modes of marketing, modified production methods, or diversification within the same business (i.e. different fruits or vegetable).

Agricultural Diversification Programs

(Established September 2001)

The Agricultural Diversification Program is fifth among county model programs in terms of investments at $11,840,156 or 12% of total county model program investments. There are 5,312 or 7% of participants, which ranks these programs just behind the four major model programs. Producers invested approximately $18,500,000 for a total combined investment of over $30,000,000.

Eligible investment areas—Agri-tourism; Commercial Aquaculture Production; Certified/Commercial Kitchen Construction or Renovation; Direct-To-Consumer Livestock Production; Equine Production; Commercial Fruit And Sweet Sorghum Production; Greenhouse Construction Or Conversion For Horticultural Enterprises; Small Animal Production (Bees and Rabbits); Production of Commercial Ornamental Horticultural Products; Poultry Production: Pastured and Other Fowl; Commercial Vegetable, Mushroom, and Herb Production; Sod Production.

Most investment areas include the following cost-share items which are termed standard cost-share items (see note below) for this report and are not listed with each investment area or program description:

- Equipment (not self-propelled) essential to provide on-farm value-added processing.
- Computer hardware and software to assist in performance record keeping and financial management.
- One half the cost of participation in the Kentucky Farm Business Management Program.
- One half the cost of membership in a producer-owned marketing cooperative
- Promotional and advertising materials in an amount not to exceed $1,000, excludes products or services provided by the Kentucky Department of Agriculture or other state programs.
- On-farm direct-to-consumer sales cost-share itemsThese standard cost-share items are common to many of the following individual program discussions and will not be repeated.:
  - Construction of new permanent structures or conversion of existing structures to be used for retail sale of product. Meeting rooms, exposition centers, educational facilities and construction or improvements to buildings serving primarily as residences are not eligible cost-share items.

- Site preparation including on-site utility extensions and officially permitted on-site waste treatment facilities.
- Refrigerated or non-refrigerated equipment (not self-propelled) for storing product.
- Display equipment, including refrigerated equipment, to assist in selling of product.

Program Goals—Improve net farm income through the development and expansion of new agricultural products and through the development of new ways of dealing with existing agricultural commodities. Encourage research and science-based decisions for the creation, management and expansion of these programs. Impact a high number of producers affected by loss of income resulting from cuts in tobacco quota. Assist producers already exploring alternative agricultural enterprises who may lack capital to further expand their programs.

Agri-tourism

Agri-tourism is an emerging opportunity for producers who are looking for inventive ways to diversify their farming operation.

Eligible Cost-share Items—Site preparation for items that ensure consumer safety: parking areas, grading, traffic flow, sidewalks, established walkways and onetime cost-share on one-half of the cost of liability insurance for new agri-tourism ventures, and standard cost-share items.

Investment Area Goals—To assist producers in the development or renovation of agri-tourism projects that promote economic activity that occurs on a farm for the enjoyment or education of the public to promote agricultural products, services, or experiences, which generates additional farm income.

Table 42: *Agricultural diversification investments.*

Agricultural Diversification Program	Average Cost-share Investment	Average Producer Investment	Average Total Investment	Average /Previous Years Sales	Average Annual Projected Sales	Average Annual Gain[a]	Years Required to Recover Investment
Agri-tourism	$2,722	$4,823	$7,545	$14,376	$17,143	$2,767	2.73
Aquaculture	$2,569	$4,017	$6,586	Insufficient Data			
Certified/Commercial Kitchen	$1,059	$1,040	$2,099	$1,750	$9,500	$7,850	0.27
Direct to Consumer Livestock	$2,393	$3,353	$5,746	$24,826	$27,246	$2,420	2.37
Equine	$2,624	$4,692	$7,316	$43,638	$49,906	$6,268	1.17
Fruit Sorghum	$2,124	$3,915	$6,039	$28,144	$35,982	$7,838	0.77
Greenhouse Conversion/Construction	$2,457	$3,676	$6,133	$28,056	$32,764	$4,708	1.30
Honeybees	$1,107	$1,266	$2,373	$1,311	$1,985	$674	3.52
Rabbit	$1,316	$1,437	$2,753	Insufficient Data			
Ornamental Horticulture	$2,253	$3,434	$5,687	$34,625	$49,241	$14,616	.39
Poultry-Pastured/Other Fowl	$1,986	$2,614	$4,599	$35,523[b]	–	N/A	N/A
Vegetable Mushroom Herb	$1,611	$2,215	$3,827	$33,913	$37,943	$4,030	.95
Sod				No Data			

[a] Average annual gain is from participants with prior sales only.
[b] Some pastured poultry and other fowl participants were involved in commercial poultry prior to investing in pastured poultry.

Analysis of Impact—Eight of 37 total producers reported participation in the agri-tourism investment area. Average cost-share funds invested were $2,722 per project with an additional average expenditure by producers of $4,823 per project or 77% more than the cost-share amount (Table 42). Agri-tourism accounted for just over 1% of all agricultural diversification investments. Based solely on average projected annual increase in sales of $2,767, it would take 2.7 years to cover the total (producer + ADB) average investment. Ninety percent of those reporting indicated that

they would have invested in the project anyway. Average farm size of those participating was approximately 100 acres, but ranged in size from 12 acres to 213 acres. The majority (73%) had a commercial agri-tourism operation prior to receiving the cost-share funds (Table 43). The types of operations were highly variable and will not be discussed here. Sixty percent were marketing other producers products prior to cost-share. While there was no indication whether the percentage might increase, participants expect to provide an outlet for an average of approximately nine other producers per agri-tourism project. While the actual degree of benefit cannot be determined, marketing products from neighboring farms improves market access and increases gross benefit to the community. Participants expect a 19% increase in sales after investment from $14,376 to $17,143 the first year. They reported an average of 2,163 visitors the year before cost-share investment, but expected a 20% increase in visitors after investment. Twenty-seven percent report that they do not carry liability insurance. This relatively high percentage without liability insurance is of great

Table 43: *Evaluation of diversification programs.*

Diversification Model Programs	**New to this type of operation**	**Percentage of Ag Diversification Funds[a]**
Agricultural Diversification Program		
Agri-tourism	27%	1.13%
Aquaculture	Insufficient data	1.01%
Certified/Commercial Kitchen	Insufficient data	0.17%
Direct to Consumer Livestock	59%	16.07%
Equine	9.5%	26.41%
Fruit and Sorghum	41%	10.96%
Greenhouse	47%	10.33%
Conversion/Construction		
Honeybees	24%	3.93%
Rabbit	Insufficient data	0.65%
Ornamental Horticulture	30%	8.97%
Poultry - Pastured / Other Fowl	75%	2.90%
Vegetable, Mushroom, Herb	10%	17.40%
Sod	Insufficient data	0.00%
Commercial Poultry	0%	
Diversification		
Dairy Diversification	0.7%	
Goat Diversification	31%	
Sheep Diversification	20%	
Swine Diversification	0%	

[a] Out of 75.1% that could be characterized.

concern risking potential loss of the farm should an accident occur resulting in a large settlement.

Conclusions—The goal of this investment area "to assist with development or renovation of an agri-tourism project to provide economic benefit while generating additional income" was achieved for those few who have utilized this program. Efforts to increase interest in this investment area are advised. University of Kentucky College of Agricultures reporting system indicated that the interest in this area is much higher than participation through the ADB would suggest. Forty counties reported significant activities aimed at developing agri-tourism.

Recommendations—Responses to the type of previous agri-tourism operation were variable, not useful for impact assessment, and could be eliminated. If counties are limiting access to this area, a statewide program would improve access. Increased emphasis on liability insurance is recommended. A one-time payment of 100% of the first years insurance premium should be considered to encourage producers to initiate an insurance policy.

Commercial Aquaculture Production

Eligible Cost-share Items—Construction of aquaculture production pond and impoundment reservoirs including earth moving costs, providing water source, and electrical power; equipment and materials necessary for pond aeration; refrigerated and non-refrigerated equipment for transporting product; and standard cost-share items.

Investment Area Goals—To assist cultivating the aquaculture industry within the Commonwealth; to provide assistance to new and established Kentucky producers seeking to make new investments or expand aquaculture production.

Analysis of Impact—The three reports from aquaculture projects were below the number needed for accurate assessment of impact for this program. However, actual participation was closer to 27 producers with 35 projects out of the 50-60 active commercial aquaculture sites in Kentucky. Other data indicated that the average cost-share investment was $2,569 per project with producers adding an additional $4,017 per project or 56% more than the cost-share amount. Aquaculture accounted for 1% of the agricultural diversification funds invested by the ADB.

Conclusions—It is unclear whether the aquaculture investment area was successful in cultivating the aquaculture industry. The industry has limited producers. Whether all had equal access to ADF is not known. The aquaculture investment areas may have encouraged a few producers to try aquaculture, but it is not known whether those producers are still in the business. There are some indications that existing operations benefited, but this cannot be confirmed.

Recommendations—The question regarding product produced is asked twice in current reporting forms. Avenues to better assist existing commercial operation should be explored and may be more productive. Small cost-share investments may not be sufficient to encourage producer to pursue new aquaculture ventures.

Certified/Commercial Kitchen Construction or Renovation

Eligible Cost-share Items—Construction materials to install the appropriate grade of washable ceiling tiles, flooring, and wall covering; materials for the installation of water lines, gas lines, and drainage lines from existing lines, not including labor; materials to install any necessary hand or mop sinks; materials to install appropriate lighting; equipment necessary to add value to fruit and vegetable crops or to produce baked items in compliance with HB 391; production supplies including jars, boxes, bottles, labeling and packaging materials; computer hardware and software; home processing, micro-processing, or commercial processing training; and other standard cost-share items.

Investment Area Goals—To assist producers in the construction of a certified kitchen on their farm or in the conversion of an existing space to accommodate a kitchen permitted by the Department of Health for the on-farm production of value-added food items, as covered by House Bill 391.

Analysis of Impact—Seven of the 14 producers who participated in construction or renovation of certified/commercial kitchens filed reports. This program is almost a true 50/50 cost-share program with cost-share funds averaging $1,059 with producers contributing an average of $1,040. Construction or renovation of certified/commercial kitchens utilized only 0.17% of the agricultural diversification funds. A majority did not have this type of operation prior to cost-share investment, but indicate they will purchase products from other producers for processing, but do not have an operation where other producers can also process their products. The average farm size for those participating in this program was 120 acres and ranged from 28 to 274 acres. Sales were expected to increase from an average of $1,750 the previous year to $9,500 after investment. Individual investments were low, but average annual returns were expected to be almost four times the average total investment. Those reporting were expecting to cover the cost of the total investment with increased returns within approximately the first quarter of the year. Some will change their marketing strategy, but most will continue to produce for farmers market sales. By buying products from neighboring farms to process and resell, participants in this program are providing an additional market for local producers while adding value to those products for resale.

Conclusion—While this program has significant potential, very few counties offered it.

Recommendations—Responses to operation type, Kentucky value-added products, number of producers, products purchase, previous years production levels, projected production levels, fees charged for use by others did not provide usable data and these questions could be dropped to improve reporting efficiency.

If counties are limiting access to this program, a state-based program should be considered so that any producer with the need could get construction or renovation cost assistance for development of a commercial kitchen. These entrepreneurs have the potential to provide considerable benefit to other producers in their communities.

Direct-to-Consumer Livestock Production

Eligible Cost-share Items—Animal transport equipment; boxes, containers, labels and packaging for transport and sales; refrigerated equipment for transporting finished product; and standard cost-share items.

Investment Area Goals—To assist producers of livestock who desire to direct-market their livestock to consumers by use of small USDA-approved slaughter facilities within the state; to increase net farm income by providing an alternative marketing outlet for commercial livestock.

Analysis of Impact—Direct-to-consumer livestock continues to gain popularity as consumers look for more locally-grown products. Only 52 reports were available for analysis for direct-to-consumer livestock projects of 597 known participants. The average cost-share was $2,393 per project with an average of $3,353 or 40% more than the cost-share in additional investments from producers. Cost-share funds utilized by the direct-to-consumer livestock projects accounted for the third largest amount of agricultural diversification funds at approximately 16% of the total. Sixty-eight percent

indicated that they would have made investments without cost-share funding. Farm size averaged 200 acres, but ranged in size from 15 to 800 acres. Fifty-nine percent indicated that they did not market direct to consumers prior to participating in the program. Those that were currently marketing direct to consumers gave various descriptions of the previous type of operation, but many indicated beef as a part of their answers. Their sales prior to cost-share averaged $24,826 annually and were project to increase by $2,420 by the next year. An average projected annual increase in sales of $2,420 would take 2.4 years to equal the total average investment. Fifty percent of those reporting were marketing products primarily on-farm with wholesale, cooperatives, farmers market, multiple and other marketing accounting for the rest of the responses. After cost-share, a higher percentage of producers plan to market on-farm. Several producers will continue to utilize stockyards as a secondary market outlet.

Conclusions—This program has promoted diversification by encouraging producers who had not utilized direct-to-consumer livestock sales to do so. The direct-to-consumer livestock investment area of the agricultural diversification program has been successful in promoting an alternative marketing system for the majority of participants in this program.

Recommendation—It is highly recommended that efforts to enhance this program be continued in order to increase producer marketing options.

Equine Production

Eligible Cost-share Items—Materials to renovate existing tobacco barns by conversions to horse stalls; fencing materials to enlarge paddock turn-out areas; water lines to existing and expansion paddock areas; equipment for transporting animals; and standard cost-share items.

Investment Area Goals—To enable farmers who previously have not been engaged in equine production or to allow producers already engaged in equine production to expand the scope of their operations; to increase net income in the equine industry statewide.

Analysis of Impact—Eight hundred ninety-five cost-share equine investment area participants received an average $2,393 with producers investing on average an additional $4,692 per project or 79% more than the total cost-share investment. Equine cost-share investments are more than 26% of the total agricultural diversification funds invested. One hundred fourteen reports were available for analysis. Forty percent indicated that they would not have made the investment without cost-share assistance. Farm size averaged 100 acres, but ranged from 10 to 500 acres. More than 90% were already involved in equine operations. Numerous types of operations were listed, but 26% indicated that breeding was a part of their operation, 19% indicated boarding, and 14% indicated training. Numerous breeds were listed, but American Quarter Horse was the predominant breed reported by 22% of those who responded. Thoroughbreds were listed by 15%, Tennessee Walking Horses were listed by 11%, and American Saddlebred were listed by 10%. Participants reported sales of $43,638 prior to cost-share investment and projected sales of $49,906, a 14% increase. Participants in the equine program expected to cover the average total investment in a little more than one year with increased profits. Average herd size was expected to increase from 12 to 17.

Conclusions—Very few respondents were new to the equine business, which raises the question whether the equine program should qualify as an agricultural diversification program. However,

if participants were developing a different type of equine business, it would qualify. This was not clear from the reports filed. Interest in the equine investment area will likely increase. The World Equestrian Games and equine incentive programs may generate more interest in this investment area in the future.

Recommendations—*A drop down menu would improve analysis for breeds. Not only were listings of breeds highly variable, certain breeds were listed by several different names. For example the American Quarter Horse was listed as American Quarter Horse, AQH, QH, QT, quarter, and quarter horse. The same was true for the Tennessee Walking Horses. Such variable data does not allow the use of standard Microsoft Excel tabulation functions, and thereby increases the length and difficulty of analysis.*

The equine investment area should be moved from the agricultural diversification program to its own category. It has more participants than dairy, swine, and poultry combined, which are separate programs.

Commercial Fruit and Sweet Sorghum Production

Eligible Cost-share Items—Seed and rootstock; transplanting equipment; fertilizer and soil amendments; plastic or plasticulture supplies and plastic laying equipment; water and irrigation supplies; trellis or other plant supporting materials; jars, boxes, labels and packaging for transport and sales; pesticide; commercial spraying equipment and related protective gear; bird netting for protection of fruit crops; specialized harvesting equipment; cooling equipment; sorting/grading equipment; cider presses and other juice extracting equipment; refrigerated and non-refrigerated equipment for transporting product; and standard cost-share items.

Investment Area Goals—To develop new revenues by assisting farmers in production of small and large fruits for sale through any commercially viable method; to enable farmers not previously engaged in fruit production to determine its economic feasibility for their particular operation; to allow producers already engaged in fruit production to expand their operation; and to assist in the development and expansion of sweet sorghum production and sale within the Commonwealth.

Analysis of Impact—Of the 459 participants in the fruit and sweet sorghum investment area, 88 reports were available for analysis. Cost-share investments averaged $2,124 with the producer investing on average an additional $3,915 or 84% more than cost-share funding. Fruit and sweet sorghum cost-share investments are almost 11% of the total agricultural diversification program investment. Ninety-one percent indicated that they would have made the investment without cost-share. Average farm size for participants in this program was 114 acres, but ranged from less than an acre to 610 acres. Forty-one percent were new to the commercial fruit or sweet sorghum business. Producers with prior commercial operations reported that 29% of those operations were commercial grape production, 16% were blueberry operations, 15% were apple orchards, 7% were sweet sorghum production, 4% were blackberry operations, 11% were producing multiple products, and 18% listed other products. Apple orchards averaged 3.1 acres in size, blueberries 3.6 acres, and vineyards 4.3 acres (one outlier was removed prior to averaging). Sufficient data were not available for other crops for averaging acres. Producers that were new to commercial fruit or sweet sorghum production reported that they intended to produce sweet sorghum (32%), grapes (18%), blackberries (14%), apples (9%) and blueberries (5%). Twenty-three percent reported that they

intend to grow multiple fruits in their new commercial fruit and sweet sorghum operation. Gross sales prior to cost-share averaged $28,411 annually, but were expected to increase to $35,982 after cost-share investment, a 28% increase in sales. Participants expected to increase sales enough to pay for total investments by the start of the fourth quarter of the first year. However, the prior average sales may be artificially low due to several reports of freeze damage that resulted in zero sales prior to cost-share. Producers reported few changes in marketing after cost-share improvement with a slight increase in sales at farmers markets, direct sales to wineries, and valued-added options. After cost-share investment producers expected to significantly reduce u-pick options and slightly decrease on-farm sales. Other benefits include improved quality and marketability of produce, reduced labor by increasing efficiency, improved marketing through sorting, and reduced fruit loss by controlling disease, insects, and wildlife damage.

Conclusions—The fruit and sweet sorghum projects contain diverse types of operations with prospects of further diversification by growing more or different types of fruit. There are significant numbers of new producers diversifying by growing fruits and sweet sorghum. Almost one-third of new producers intended to pursue sweet sorghum production. All fruit and sweet sorghum investment area goals were met and the program was one of the most successful diversification programs.

Recommendations—Dropdown menus with common fruit production operation and a multi-option would improve reporting for fruit and sweet sorghum projects. Direct sales to wineries should be added before and after marketing options. Producers were asked to report acres of their 1st, 2nd, and 3rd crops prior to cost-share if applicable. However, there was no way to clearly identify the 2nd and 3rd crops. Therefore, averaging acres that could be vineyards, apple orchards, blueberry patches, or sorghum fields does not generate meaningful data. Acres, production levels and yield before and after are too variable for use and should no longer be included on reporting forms. This successful program should be retained and enhanced where possible.

Greenhouse Construction or Conversion for Horticultural Enterprises

Eligible Cost-share Items—Cooling and heating systems; automatic irrigation systems; benches, tables, rails; hydroponic growing systems and components; refrigerated and non-refrigerated equipment for transporting product; greenhouse materials (plastic, glass, wood or metal); and standard cost-share areas.

Investment Area Goals—To assist producers in converting existing tobacco greenhouses to other horticultural uses; to assist in construction of new greenhouses for horticultural uses; and to develop a year-round horticultural industry within the Commonwealth.

Analysis of Impact—Of the 376 greenhouse construction or conversion investment area participants, 63 reports were analyzed. Cost-share investments averaged $2,457 with producers investing on average an additional $3,676 or 50% more than cost-share funding. Greenhouse construction or conversion cost-share investments are over 10% of the total agricultural diversification program investment. Seventy percent indicated that they would not have made the investment without cost-share support. Average farm size for participants in this program was 109 acres, but ranged from less than an acre (0.7) to 900 acres. Forty-seven percent indicated that they were new to greenhouse production. Greenhouse production prior to cost-share included bedding plants, vegetable plants, flowers, and tobacco plants, but answers were too variable and inconsistent in terminology to

generate useful results. Production type information after cost-share was unavailable for analysis. Sales increased from an average of $28,056 prior to cost-share to $32,764 after cost-share. Total average increase in gross sales after investment is expected to take only 1.3 years to cover total average investment costs. Other benefits may include efficiency, labor savings, and improvements in growing environments that produce healthier plants, which reduces production cost or reduces disease losses. Responses to projected production levels were too variable and contained inconsistent units of production, rendering analysis impossible. Marketing options did not change drastically after cost-share investment with on-farm sales the dominant method of marketing before and after. Fewer producers chose wholesale as an option after cost-share.

Conclusions—The greenhouse construction or conversion investment area accomplished two of three goals. It has assisted former tobacco producers to reconfigure their tobacco transplant greenhouses so that they could produce horticultural crops and assisted producers with the construction of new greenhouses. However, tobacco greenhouses are not suitable for all types of greenhouse operations. There is no indication that this investment has helped develop a year-round horticultural industry within the Commonwealth.

Recommendation—High tunnel structures should be considered as an option under this investment area.

Small Animal Production

Investment Area Goals—To assist farmers in diversifying into small animal production through acquisition of quality stock and commercial equipment; to encourage additional processes that will add value to the market price of the small animals.

Honeybees

Eligible Cost-share Items—New or used hives, other wooden ware, foundation, specialty supers; new or used extractor, honey processing, bottling and storage equipment; purchase of bees from an inspected source; protective suits, veils, gloves, smoker, hive tool; jars, bottles, labels, boxes, signage for promoting/selling honey; candle making supplies, including wax melter, molds, wicks; approved medications and non-motorized equipment essential for the transportation of beehives; and other standard cost-share items.

Analysis of Impact—Of 316 participants in the honeybee investment area, 67 reports were analyzed. Cost-share investments averaged $1,107 for honeybee projects with producers investing on average an additional $1,266 or 14% more than cost-share funding. Honeybee cost-share investments are almost 4% of the total agricultural diversification program investment. Eighty-eight percent indicated that they would have made the investment without cost-share support. Average farm size for participants in this program was 98 acres, but ranged from five to 474 acres. Seventy-six percent indicated that they were involved in honey production prior to investment. Sixty-four percent of those who indicated that they were already involved in beekeeping described their operation as a hobby with 39% reporting that their operation was commercial. The rest either did not respond or listed some other farming operation. There were no questions on the reporting form that asked if those describing their operation as a hobby would change the description to commercial after investments. Of those responding to questions regarding before and after estimates of gross sales,

average gross sales were expected to increase from $1,311 to $1,985, a 57% increase. Although 3.5 years are required to recover the total average investment through increases in sales, producers realized other benefits such as improvement in equipment and hives, commercial supplies, reduced labor, and improvements in extraction efficiency, etc. Although most were already involved in honey production, investments should help change some operations from a self-described hobby to a commercial operation. Production was expected to increase by more than 60% after investment from an average of 356 to 575 pounds. Production data was reported in various units, but was normalized to pounds by using a factor of 11.75 lb/gal. Cases were assumed to contain 24 12 oz. bottles. Fifty percent sold their honey on-farm prior to investing, but expected to explore more sales options after investment (e.g., farmers markets).

Conclusions—Although a relatively high percentage of participants were already involved in honey production, many considered their prior experience as a hobby. Investments helped many shift their thinking from hobby status to more of a commercial venture. Equipment investments should pay dividends for several years. Modest returns are expected and may take more time than in other investment areas to recover investment costs. Many of the investments are not intended to necessarily increase revenue significantly, but are intended to improve efficiency and quality. Small animal goals appear to have been achieved by the honeybee investment area.

Recommendations—Questions regarding type of operation should employ a dropdown menu with hobby, commercial or other as options. Producers should be asked if their operation will be commercial after investment. Previous years sales should be followed by projected sales for ease of tabulation. Production levels should be in a single unit of measurement, if possible. The after investment marketing question should follow the before question. No program changes are recommended.

Rabbits

Eligible Cost-share Items—Commercial bred New Zealand White or Californian breeding stock; cages or wire to make cages; automatic (nipple) water delivery system, including line, regulators, medicators, and pumps; feeders, nest boxes; materials to construct manure handling system; ventilation equipment such as fans, curtains, heaters, air conditioners; transport cages; and standard cost-share items.

Analysis of Impact—The three reports from the rabbit investment area were below the number needed for accurate assessment of impact of this program. However, actual participation was approximately 44 participants. Cost-share investments averaged $1,316 for rabbit projects with producers investing on average an additional $1,437 or 9% more than cost-share funding. Rabbit cost-share investments are 0.65% of the total agricultural diversification program investment. No prior or projected gross sales were available for comparison.

Conclusions—Data were insufficient to determine the viability of this investment area. However, it is suspected that, for the 44 participants, the goals of the small animal program were met. The viability of this investment area could not be determined.

Recommendations—Questions regarding total annual sales before and after cost-share are needed to assess impact. However, number of breeding males and females, rabbits purchased, and average weight of rabbits marketed are not as important for measuring impact and may generate variable data.

Production of Commercial Ornamental Horticultural Products

Eligible Cost-share Items—Seed and rootstock; soil, media for plant production; transplanting equipment; fertilizer and soil amendments; plastic or plasticulture supplies and plastic laying equipment; water and irrigation supplies; containers for growing plants; boxes, labels and packaging for transport and sales; pesticide; commercial spraying equipment and related protective gear; harvesting equipment, including mechanized tree spades; cooling equipment; refrigerated and non-refrigerated equipment for transporting product; and standard cost-share items.

Investment Area Goals—To assist in the development within the Commonwealth of an ornamental horticultural product industry, including landscape plants and fresh and dried flowers; to encourage farmers to establish ornamental horticultural operations on their farms; to assist farmers already engaged in ornamental horticulture to expand their operations.

Analysis of Impact—Of the 354 participants in the commercial ornamental horticulture products investment area, 64 reports were analyzed. Cost-share investments averaged $2253 with producers investing on average an additional $3,434 or 52% more than cost-share funding. Commercial ornamental horticulture products cost-share investments are almost 9% of the total agricultural diversification program investment. Eighty-one percent indicated that they would have made the investment without cost-share support. Average farm size for participants in this program was 98 acres, but ranged from less than one acre to 450 acres. Seventy-five percent indicated that they had a commercial ornamental horticulture operation prior to investment. Types of operations before investment were highly variable and no single type stood out among those indicating that they were already involved in commercial ornamental horticulture. Of those responding to questions regarding before and after estimates of gross sales, average gross sales were expected to increase from an average of $34,625 to $49,241, a 42% increase. Those who answered that they were not previously involved in a commercial operation projected sales of almost $40,000 after investment. The average single season increase in gross sales of almost $15,000 more than doubled the average investment cost of $6,402. An average increase in sales of $20,929 after investment was calculated from both those with and those without prior involvement and adjusted by the number in each group. Marketing strategies were primarily on-farm sales (62%) prior to investment and are not expected to change drastically after investment, with the exception that producers expect to explore more marketing options in addition to on-farm sales.

Conclusions—Although only 25% used the cost-share investments to get into the commercial horticulture business, others used the investment to diversify by pursuing other types of horticultural crops. These investments are expected to continue to produce similar improved returns for many years. Returns on these investments could be more than ten times the investment cost over the life of the cost-share improvements.

Recommendations—Reports on production level before and after investments in commercial ornamental horticulture yields no valuable information for assessing impact and should not be collected. Total gross sales are sufficient for analysis. Sales per crop are inconclusive and not useful for impact assessment. Production levels either before or after investment were reported in various forms including trees, mums, acres, greenhouses, flats, and hanging baskets, and were not useful for analysis.

The commercial ornamental horticulture program produced some of the highest returns on investment. Investment area goals were achieved, but further investment in this area is advised.

Poultry Production: Pastured and Other Fowl [2]

Eligible Cost-share Items—Commercial breeding stock; feeders, waterers, brooders, poultry coops, nesting boxes; poultry netting and other temporary fencing; grazing cages (field pens), rolling hen houses, skid mounted chicken houses; permanent pens and shelters (Other fowl, only); fruit trees for poultry feed source; egg processing and packaging equipment, including coolers and refrigerators; pasture / pen water lines or alternative water sources; refrigerated and non-refrigerated equipment (excluding motorized vehicles) for transporting product; and standard cost-share items.

Investment Area Goals—To enable farmers involved in poultry production to expand the scope of their enterprise and/or modernize their facilities in order to improve profitability; to encourage additional processes which will add value to the market price.

Analysis of Impact—Of 130 participants in the poultry production: pastured and other fowl investment area, 13 reports were analyzed. Cost-share investments averaged $1,986 with producers investing on average an additional $2,614 or 32% more than cost-share funding. Poultry production: pastured and other fowl cost-share investments are almost 3% of the total agricultural diversification program investment. Several commercial poultry reports were included with the pastured poultry and other fowl database, but were removed prior to analysis and moved to the commercial poultry database. Half of those responding indicated that they would have made the investment without cost-share support. Average farm size for participants in this program was 69 acres, but ranged from six to 168 acres. Seventy-five percent indicated that they did not have pastured poultry and other fowl operation prior to investment. However, a few producers had commercial poultry operations prior to investment in pastured poultry based on answers in their reports. Type of operation, breed, market, and production levels were not answered by many producers, while answers given were highly variable and not useful for determining impact. With few reporting prior pastured poultry operations, previous year sales were inconclusive. Some producers reported sales from their commercial operations as their previous year sales, which if included in the analysis would have highly inflated sales prior to investment. However, sales data after investment were not collected and therefore unavailable for analysis or comparison with prior sales. Eighty-nine percent utilized farmers markets as at least one of their marketing options. Other marketing options used by those reporting were on-farm sales (44%) and direct–to-consumer sales (22%), as well as one report of community supported agriculture (CSA) agreement and sales to a restaurant.

Conclusions—The pastured poultry and other fowl investment area definitely meet the criteria of a diversification program. Most of those that participated were new to this enterprise. Two producers appeared to be commercial poultry operators prior to investment based on other data submitted. However, this also qualifies as a diversification into another type of production. The goals established by the ADB were achieved by this investment area.

Recommendations—Having two poultry model programs appears confusing to producers with reports ending up on the wrong form. It may also be confusing for those compiling the data, since some

[2]Other fowl are listed as squab, pheasant, quail, chuckar, partridge, guinea fowl, water fowl and pea fowl.

reports were submitted on the correct form, but compiled with the wrong model program. Reporting forms do not have any questions regarding projected sales for pastured poultry like other program reporting forms do. Breeds raised and products produced do not aid in impact assessment. The question regarding benefits the cost-share had on their operation is vague and was interpreted numerous ways by producers generating various forms of answers that cannot be analyzed into meaningful results.

Investments in the poultry production (pastured and other fowl) should be continued and help with expansion of markets is advised.

Commercial Vegetable, Mushroom, and Herb Production

Eligible Cost-share Items—Seeds, seedlings, spores, cuttings and transplants; soil, media for plan production; containers for starting/selling herbs; fertilizer and soil amendments; plastic or plasticulture supplies and plastic laying equipment; water and irrigation supplies; boxes, labels and packaging for transport and sales; pesticide; commercial spraying equipment and related protective gear; cooling equipment; sorting/grading equipment; refrigerated and non-refrigerated equipment for transporting product; specialized harvesting equipment; and standard cost-share items.

Investment Area Goals—To develop new revenues by assisting farmers in small acreage production of vegetables, including edamame, mushrooms, and herbs for sale through any commercially viable method; to enable farmers not previously engaged in vegetable or herb production to determine its economic feasibility for their particular operation; and to allow producers already engaged in vegetable or herb production to expand their operation.

Analysis of Impact—Of the 960 participants in the commercial vegetable, mushroom, and herb investment area, 155 reports were available for analysis. Cost-share investments averaged $1,611 with producers investing on average an additional $2,215 or 37% more than cost-share funding. Commercial vegetable, mushroom, and herb cost-share investments are over 17% of the total agricultural diversification program investments, more than most stand-alone programs. Eighty-five percent indicated that they would have made the investment without cost-share support. Average farm size for participants in this program was 123 acres, but ranged from less than one acre to 800 acres. Eighty-six percent indicated that they had a commercial vegetable, mushroom, or herb operation prior to investment. Sixty-seven percent described their operation type as multiple with 9% indicating that their operation was other than the 20 types listed on the reporting form. Nine percent indicated that they grew tomatoes, four reported growing pumpkins, three each reported corn and asparagus, two each reported beans and melons, and there was one report each for peppers, greens, and gourds. Prior or projected product levels and acres were so variable that analysis was not possible. Of those reporting prior sales and projected sales, sales were expected to increase from an average of $33,913 to $37,944, a difference of $4,041. This difference indicates that producers of commercial vegetables, mushrooms, and herbs paid for the total investment in slightly less than one year. These investments will likely continue to generate benefits for several years. Producers indicate that their marketing plans will change little due to cost-share investments.

Conclusions—While most participants were already in the commercial vegetable, mushroom and herb business, they used cost-share funds to diversify within this business and to expand their

operations. However, the program did not entice many new producers. The returns on investment were high for this investment area. Investment area goals were achieved.

Recommendations—*Commercial vegetable, mushroom and herb producers tend to be diversified and most often will grow multiple types of produce. Therefore, asking those questions either prior to cost-share or after may not generate useful data and could be removed from the reporting form. Prior or after cost-share production levels for operations that are diverse by nature tends to generate data that cannot be easily analyzed or evaluated. The current reporting form asks total commercial acres. This is an improvement over acres of the main crop, crop number two, and crop number three, which were of little value for this report. Marketing strategies were not expected to change drastically after investment with the exception of a slight increase in favor of farmers markets over multiple marketing options.*

This investment area is large enough to be a separate diversification program.

Sod Production

Eligible Cost-share Items—Seeders, finishing mowers (non-motorized), turf tires, net layers, tillers, rollers, trailers, sprayers, spray tips, irrigation equipment, nurse tanks, sweepers, aerators, and standard cost-share items.

Investment Area Goals—To develop new revenues by assisting farmers in production of sod for sale through any commercially viable market. To enable farmers not previously engaged in sod production to determine its economic feasibility for their particular operation. To allow producers already engaged in sod production to expand their operation.

Analysis of Impact—No data were available for analysis.

Conclusion—Since no data were available for this investment area, it appears that this area has not been used.

Recommendations—*With no data reported, it is unclear whether this investment area has been utilized. If in fact no producers are using this program, it could be dropped from future county model program options. If it is retained, questions regarding previous sod operations prior to cost-share and before and after sales would be valuable data for future reports for this model program. Production levels before or after cost-share may generate variable answers and could be eliminated from reporting. Marketing options either before or after cost-share may be more limited than with other products and may not generate useful data.*

Efforts are needed to generate participation in this area or the area should be dropped.

Commercial Poultry Diversification Program

(Established December 2006, Updated November 2007)

Eligible Cost-share Items—Equipment for litter management; insect sprayers/cleaning and disinfection equipment; compost equipment/mortality disposal equipment; energy saving equipment and building modifications; building modifications and equipment to improve profitability and net

income; alternative water sources; litter storage buildings for producers in counties where local boards have not made it a priority; refrigerated and non-refrigerated equipment for transporting product; and standard cost-share items.

Program Goals—To enable farmers involved in poultry production to expand the scope of their enterprise and/or modernize their facilities in order to improve profitability; assist farmers who have not previously been involved in poultry production; to encourage additional processes that will add value to the market price; and to impact producers affected by loss of income resulting from cuts in tobacco quota.

Analysis of Impact—Commercial poultry reports included with the pastured poultry and other fowl database were added to the commercial poultry database prior to analysis. Investments totaled $114,783 or 0.1% of total county model program investments for commercial poultry programs, with 35 participants averaging $3,280 per project with producers investing on average an additional $10,517 or three times more than the cost-share investment. Ninety-four percent of those responding indicated that they would have made the investment without cost-share support. Those indicating that they would have made the investment without cost-share support reported the smallest farm sizes. Average farm size for participants in this program was 139 acres, but ranged from six to 825 acres. All of those participating in this program were already involved in commercial poultry production. Too few responded to the question regarding type of operation for results to be meaningful. Most producers responding to both prior to cost-share sales and projected sales reported no change. Only one producer indicated that they expected sales to increase. That increase was projected to be six times that of prior sales. That same producer indicated that they would not have made the investment without cost-share. However, with most producers contracting, gross sales may not be the area where returns are realized. There were no questions on reporting forms that address other benefits such as labor savings. Half of those reporting indicated that they were contracting. Others were marketing wholesale (25%) or through cooperatives (25%). Marketing plans were not expected to change after cost-share. Production levels were reported in both numbers of birds or flocks and, therefore, could not be normalized for analysis. Those reporting production levels as number of birds indicated that almost 12.5 million birds were impacted by cost-share investments.

Conclusions—With contract sales the norm for commercial poultry producers, benefits may be primarily labor savings rather than an increase in sales. None of those reporting participation were new to commercial poultry production. Size of typical investments is not substantial enough for producers to consider starting a new commercial poultry operation. Although other goals were met, the goal to assist new producers may have been overly optimistic.

Recommendations—Since all participants reporting were already in the commercial poultry business, this program does not fit as a diversification program. Current questions on reporting forms do not match the database analyzed, indicating recent changes to report forms. A question regarding expected economic impact in dollars and expected labor savings would improve assessment of impact.

The commercial poultry program should not be billed as a diversification program.

Dairy Diversification Program

(Established December 2004, Updated November 2007)

Eligible Cost-share Items—Milking equipment and generators; feed ways, forage mixers, feeding equipment systems, automatic waterers; calf hutches, palpation rails, free-stall mattresses, specialized equipment for bedding free stalls; cooling fans and sprinkler systems; renovation of existing dairy barns or existing tobacco barns into dairy facilities; construction of new dairy facilities or calf raising facilities where no buildings exist for renovation; animal and raw milk transport equipment (excluding motorized vehicles); cooling and raw milk storage equipment; manure collection and distribution equipment (excluding manure spreaders); and standard cost-share items.

Program Goals—To encourage and assist existing and new dairy producers throughout the Commonwealth in renovating and modernizing dairy facilities; encourage research and science-based decisions for the creation, management and expansion of these programs; and to impact producers affected by loss of income resulting from cuts in tobacco quota.

Analysis of Impact—Data indicated that the investment was $1,235,060 or 1.2% of all county model program investments with 411 participants. Cost-share investments averaged $3,251 with producers investing on average an additional $5,259 or 62% more than cost-share funding. Of those, 157 reports were available for analysis. Ninety-three percent of those responding indicated that they would have made the investment without cost-share support. Farm size was not available for analysis. All but one producer of those reporting were already involved in dairy production. Twenty-eight percent described their operation as pasture based only, 19% were dry lot and stored feed only, and the rest (58%) indicated both types. Average cow herd size was expected to increase from 75 head before cost-share to 84 head after. Average heifer numbers were expected to increase from 58 head before cost-share to 66 head after. Milk production prior to cost-share investment averaged over 1 million pounds, but was projected to increase by 11% to just over 1.2 million pounds. Annual sales were projected to increase by almost 17% from an average of $204,317 to $238,600 after cost-share. Sixty-nine percent were marketing through cooperatives, 19% were selling to independent processors, 5% through direct contract, and 6% reported other types of marketing. None of the producers indicated that their marketing source would change after cost-share. When asked about benefits from cost-share investment, producers gave numerous answers. A quarter of those answering mentioned improvements in efficiency, 20% stated improvement in feed efficiency, 16% felt that herd health was improved, 13% noted increases in production, 12% saw improvements in quality, 12% felt that cow comfort was improved (which has been proven to increase production), 7% reported higher profits and others reported improvements in equipment, facilities and hauling. Percentages do not add up to 100% due to some producers listing multiple answers. Some of those benefits would: improve efficiency by reducing feed loss, improve cow comfort, reduce labor and save fuel through improvements in equipment, facilities and hauling, and improve herd health by reducing disease and stress.

Conclusions—Items purchased in this cost-share area could not be determined from the data supplied. Producers gave other improvements besides increased sales as benefits. This program did not encourage new dairies, but the size of typical investments is not substantial enough for producers to consider starting a new dairy. Pursuing other markets is not a likely area for diversification either. A few dairy producers appeared to be reaching investment caps.

Recommendations—As more dairy producers reach caps, the future of this program must be considered. This program should not be billed as a diversification program.

Goat and Sheep Diversification Program

(Established August 2001, Updated December 2005)

Program Goals—To assist numbers of producers to diversify into goat/sheep production; position goat/sheep production as a viable and complementary income source for Kentucky livestock and tobacco producers; promote animal health and encourage science-based solutions to obstacles of goat/sheep production; improve the wool quality of Kentucky sheep flocks; encourage the development of goat/sheep production, marketing, and value-added infrastructure; and improve the genetic base of Kentuckys goat herds and sheep flocks.

General Analysis of Impact—Investments in the goat and sheep diversification program totaled $3,323,767 and accounted for 3% of total model program investments. There were 4,294 participants in the combined program. Separate investment or participant data for goats and sheep were not available. However, it was clear that the participation in the goat part of the program was significantly higher than that for sheep. Cost-share investments averaged $774 for this program. Producers average investment per cost-share project was not available, but at least an average producer investment of $774 was required. Databases for goats and sheep were separate and will be discussed separately.

Goat Diversification

Eligible Cost-share Items—Goat handling, buck/semen purchase, buck lease, breeding female purchase, and dairy facilities

Analysis of Impact—A total of 260 reports were analyzed for the goat portion of the goat and sheep diversification program. Numerous lines of duplicate data were removed prior to analysis. Most were from multiple participation in the program where only one entry contained statistical data. Unique data was retained. Farm size averaged 105 acres for participants in the goat diversification program, but ranged from three to 1300 acres. Seventy-six percent indicated that they were involved in goat production prior to cost-share investment. Producers indicated that the breeding doe numbers increased from an average of approximately 23 to 33 head, a 39% increase. They indicated that the difference in doe numbers were the same as does purchased with cost-share funds. Average buck numbers prior to cost-share were 1.5 per farm, but increased slightly to 1.8 after cost-share, a change of 18%. Participants marketed 27 goats on average with an average weight of 61 pounds prior to cost-share at an average price of $109 per head grossing an average of $2,891 per participant. Producers who responded to market type prior to cost-share investment listed stockyards as the primary marketing outlet at 63%, on-farm sales at 34%, tel-o-auction at 10%, with graded sales, private sales, internet sales and other listed less frequently. Many gave multiple answers and percentages will not necessarily add to 100%. Producers indicated that they would still prefer stockyards (57%) after investment, but indicated a slight drop in utilization of that option. On-farm sales (19%) were expected to drop significantly in favor of direct-to-consumer sales (20%), an option rarely mentioned in prior sales. Smaller increases were expected in tel-o-auctions (15%), graded sales (7%) and internet sales (5%). Almost half of the producers indicated more than one marketing plan.

Conclusions—While the total investment in the goat and sheep diversification program is relatively small, a large number of producers were impacted. Typically, cost-share items are less expensive than those for cattle. The actual impact is difficult to measure due to the lack of specific data regarding projected gross sales after cost-share and producer investments. Data from the goat and sheep programs were pooled, which made analysis difficult. Although only 24% were new to goat production, producers were diversifying into more markets than prior to investment. Some of the benefits may also impact herd health, ease of handling and improved genetics within the herd. Goals for the goat part of the program were achieved.

Recommendations—Questions about projected gross sales typically asked on other program reporting forms were absent on the goat form. Other questions regarding numbers of breeding does and bucks, number of goats marketed, average weight prior to investment are not as relevant for impact assessment. Projected changes would be more relevant.

Sheep Diversification

Eligible Cost-share Items—Sheep handling, ram/semen purchase, ram lease, breeding female purchase, and wool.

Analysis of Impact—A total of 35 reports were analyzed for the sheep portion of the goat and sheep diversification program. Duplicate data were removed prior to analysis. Farm size averaged 61 acres for participants in the sheep diversification programs, but ranged from five to 250 acres. Seventy-seven percent indicated that they were involved in sheep production prior to cost-share investment. Producers reported that the average number of breeding ewes increased from an approximately 48 to 53 (10%). However, they purchased on average eight breeding ewes indicating stock losses, sales, etc. Average ram numbers prior to cost-share were slightly less than four per farm on average, but decreased to an average slightly more than one after cost-share, a decline of 69%. Participants marketed approximately 36 sheep on average with an average weight of 101 pounds prior to cost-share at an average price of $99 per head grossing an average of $3,539 per participant. Producers who responded to market type prior to cost-share investment, listed stockyards as the primary marketing outlet at 53% and on-farm sales at 27%. Other marketing options included direct-to-consumer, graded sales, and private sales. Producers indicated that they would still prefer stockyards (35%) after investment, but indicated a drop in utilization of that option. On-farm sales (16%) were expected to drop also in favor of various other options that included tel-o-auction, internet, organic and other value-added options.

Conclusions—The sheep portion of the goat and sheep diversification program is small in comparison to the goat portion and impacts fewer producers. This in no way diminishes the impact that it has had on the participating sheep producers. However, the actual impact is difficult to measure due to the lack of specific data regarding projected gross sales after cost-share and producer investments. Total sheep program participants and actual expenditures could not be separated from goats from the data received from the GOAP. Although only 23% were new to sheep production, producers were diversifying into more markets than prior to investment. Some of the other benefits may impact flock health, ease of handling and improved genetics within the flock. There is no indication that the sheep diversification program has helped improve wool quality in Kentucky.

Recommendations—Questions about projected gross sales typically asked on other program reporting forms, were absent on the sheep form, but are valuable for assessing impact. Other questions

regarding numbers of breeding ewes and rams, number of sheep marketed, and average weight prior to investment are not as relevant for impact assessment. Projected changes would be more relevant. Answers to marketing type were inconsistent and had to be normalized prior to analysis. Participants gave multiple forms of the same market type.

Yarn sales questions were not available for this report, but could be useful for future assessment. However, a question remains as to the number of producers that will participate in this part of the program and how many would report yarn sales in the future. One producer mentioned yarn sales under markets, but specifics were not available. Projected gross sales of wool are important for assessment, if sufficient numbers can be generated to make analysis meaningful. The question in the reporting form on how much wool is incomplete and needs revising. The question should read "If yes, then how much wool did you market last year?". Where the wool will be marketed allows those reporting to give inconsistent answers and many forms of the same answer. The same is true for value-added wool product types and market options for those products. Based on answers to sheep marketing, answers will be varied and difficult to analyze unless there is some direction in the form of multiple choice options.

Swine Diversification Program

(Established December 2004)

Eligible Cost-share Items—Materials to renovate existing swine facilities or existing tobacco barns into swine facilities; up-to-date equipment (ventilation, feeding, penning, etc.) to improve production efficiency; construction of new swine facilities where no buildings exist for renovation; purchase of hoop-structure buildings, or other loose-bedding housing systems, to be used for swine production or storage of bedding used in loose-bedding systems; feed ingredient and complete diet sampling equipment and analysis; purchase of boar semen to improve the genetic base of the swine herd; purchase of up to 20 high quality replacement gilts to improve the genetic base of the swine herd; equipment needed for on-farm collection, processing, storage, and utilization of semen in an artificial insemination program; equipment for on-farm pregnancy detection and body condition scoring of sows; and standard cost-share items.

Program Goals—To enable farmers who have not previously been involved in swine production to begin a swine enterprise; to allow producers already engaged in swine production to expand the scope of their enterprise and (or) modernize their facilities; encourage research and science-based decisions for the creation, management and expansion of these programs; and to impact producers affected by loss of income resulting from cuts in tobacco quota.

Analysis of Impact—Participants totaled 17 in the swine diversification program, but only eight reports were available for analysis. Cost-share investments averaged $2,795 for swine diversification programs. Producers total investments per cost-share project were not available for calculating an average, but at least an average producer investment of $2,795 was required. Only one producer indicated that they would not have made the investment without cost-share support. Average farm size for participants in this program was 223 acres, but was inflated by the small number of reports and one large producer with 875 acres. The average drops to 130 acres without the large producer and ranges from 20 to 390 acres. All reported that they were swine producers prior to cost-share investment and had farrow-to-finish operations. Average breeding sow numbers were

significantly inflated by the large producer whose numbers did not change after investment. Other producers averaged 34 breeding sows prior to cost-share and 40 after. Average boar numbers did not change. Although the previous years sales were reported there were no projected sales figures for comparison. Number of sows marketed ranged from 100 to 70,000, but most reported in the range of 100 to 300. Average market weight was 217 lbs., although the average was suppressed by two low numbers. Median weights reported were in the range of 250-260 lbs. Marketing information was inconclusive due to the small number of reports.

Conclusions—The goal "to enable farmers who have not previously been involved in swine production to begin a swine enterprise" was not achieved if those reporting are typical of all participants. Not all producers may have access to the program, if a producers county council chooses not to offer this program. Typically producers are diversified and can participate in other cost-share programs.

Recommendations—Prior and projected sales are important for impact assessment, but questions regarding projected sales were not on reporting forms. Breeding sow numbers, boars, sows purchase with cost-share investments, numbers marketed, average market weight, and where marketed are not as valuable for impact assessment. (Note: Breeding sows are not available for cost-share investment, but gilts are).

This program should not be billed as a diversification program.

Other Model Programs

Farm Livestock Fencing Improvement Program

(Established March 2003)

Eligible Cost-share Items—Posts, fences, and supplies, including woven and wire fencing, not to include plank fencing or gates; no mechanized equipment will be eligible, except as provided by rental or contract; funds will reimburse material expenses and vendor labor.

Program Goals—Improve net farm income through improved pasture utilization for livestock producers; encourage boundary fencing repair or replacement to allow for expansion of contained pasture and forage up to the standard for livestock containment, thus increasing the herd size and carrying capacity of the farm; impact a high number of livestock producers; enhance the efficiency and utilization of the current Forage Resource Improvement and Utilization program.

Analysis of Impact—The farm livestock fencing improvement program was the sixth largest in term of investments of $8,813,429 or 9% of total county model program investment with 4,674 or 6.5% of participants averaging $1,886 per project. Seventeen hundred and three reports were analyzed. Some farms reporting cost-share investments for fencing had multiple types of livestock but, on average, farms reporting beef (84%) averaged 54 head, horses (14%) averaged eight head, stockers (13%) averaged 68 head, goats (7%) averaged 31 head, dairy (5%) average 65 head, and dairy heifers (3%) averaged 50 head. Others were reported but in such a manner that analysis was unproductive. Fifty-nine percent reported that they plan to renovate or establish new pastures averaging 35 acres as a result of the fencing program. The average number of pastures before and after cost-share investment could not be accurately determined due to numerous reports with

number of acres reported instead of number of pastures. This data issue could not be reconciled. Acres before investment averaged 96, but were expected to increase to 139 for an additional 45 acres or almost a 50% increase in pastures. Fifty-nine percent of producers expect to increase herd size, but not proportional to the increase in pasture acreage. They expected the average stocking rate for beef cattle to decrease to a more productive rate of 0.76 units per acre down from 0.9 units prior to investment. A reduced stocking rate can mean improved gains and increased net returns per head and can provide a potential extension of the grazing season which would reduce the need for stored feed (Kenny Burdine, personal communication).

Conclusions—The farm livestock fencing improvement program was highly successful, allowing farm owners to establish more pasture for their cattle and other livestock. This program primarily impacted beef operations, as did the major model programs. Net farm income was improved and pasture and hay fields were expanded. Carrying capacity was increased and improvements were made that may increase the grazing season, thereby reducing dependence on stored feed. This program attracted the sixth largest number of producers.

Recommendations—Type of fence was not available for review, but current forms ask for this input. Agricultural agents reported that in addition to barbed wire, woven wire, and high tensile, high tensile woven should be added to the options. If other livestock is an option under livestock type, separate reporting columns are needed for type and size for ease of tabulation and analysis. The questions regarding number of pastures before and after cost-share were misunderstood by many participants. This may not be easily resolved and, therefore, may need to be dropped in favor of total acres only. Producers who respond with a yes to the question regarding plan to increase herd size are asked to give how many. The question is vague and elicits responses of numbers only without stating livestock type, livestock type and number in one cell which are difficult to analyze, and various other inconsistent data.

Fencing other than perimeter fencing should be considered.

On-Farm Water Enhancement Program

(Established March 2003)

Eligible Cost-share Items—On-farm pond, subsurface aquifers/wells, on-farm spring piping, small stream water basin, and city/county water hook-up.

Program Goals—Impact a high number of producers affected by loss of income resulting from cuts in tobacco quota; present farmers with the opportunity to develop on-farm water enhancement systems to address limited water resources; ensure farmers engaged in crop and livestock production have access to water resources, which is imperative to maximize yields, increase production, control costs of production and improve net farm income; provide program guidelines that will ensure that any on-farm water enhancement plans that are implemented are in compliance with local, state and federal regulations.

Analysis of Impact—The on-farm water enhancement program had investments of $1,477,188 or 1.5% of total county model program investments with 771 participants or 1.1% of total county model program participants averaging $1,916 in cost-share investments per project. Producer contributions were not available for comparison. Three hundred and thirty reports were available for analysis. Average farm size was 194 acres with a range of three to 1,600 acres. Of the 15% who responded to the capacity of the water source most responded in acre feet. However it was unclear whether the response was actually in acre feet or merely acres. The average was 1.6 acre feet. Of those few reporting capacity in gallons per minute (gpm) the average was approximately 26 gpm. Ninety-six percent reported that the intended purpose of the cost-share investment was for livestock purposes only. Two percent indicated crop irrigation with another two percent reporting that it was for other purposes. Less than one percent reported that the investment was for both livestock and crop irrigation. Eighty-one percent were not participating in order to replace city/county water. However, of those that were participating to replace city/county water, the projected annual average savings of $1,652 is almost equal to the cost-share investment. More than half (56%) will continue to use city/county water. Their reasons varied, but included limited or inconsistent water source due to drought (40%), the city/county water supply is their only source (20%), water quality is better for their livestock (13%), they like the convenience (9%), the city/county water supply serves as a backup to their other supply (7%), the city/county water supply allows them to take advantage of rotational grazing (6%), and 5% listed other reasons. More than half (51%) reported that they

do not fence their water source, but 55% were able to eliminate livestock access to streams on the farm. Participants averaged almost two additional watering points (1.7) per project investment. Two-thirds reported that they have changed to rotational grazing as a result of the cost-share investment.

Access to water is a major limitation for those wishing to reap the benefits of rotational grazing. The basic benefit of rotational grazing is more production per acre of pasture (Henning). More specific benefits include increased carrying capacity (0.5 to 0.67 cow calf units (Hoveland, McCann, Hill)), improved pasture utilization, and better distribution of nutrients across grazing areas. If an 80% weaning rate and a 450 lb average weaning weight is assumed, then the producer is able to sell 360 lbs of weaned calf per cow. At the higher stocking rate, this would mean an additional 61 lbs per acre. Assume that the price received is $0.10 over cost of production per lb, and this increases profit per acre by $6.10 (Burdine, personal communication).

The length of the grazing season is often also extended through rotational grazing, which lowers hay or winter feeding costs. If the assumption is made that an additional 30 days of grazing are gained through rotational grazing, and if hay costs are estimated to be about $1 per head per day, feed savings would calculate to be $20.10 per acre (using 0.67 stocking rate). Additional benefits could potentially come from lower pasture fertilization costs due to improved nutrient (manure) distribution and incorporation of legume or grass/legume forages (Burdine, personal communication).

Of the four producers who indicated that the intended purpose of their cost-share investment was crop irrigation, all reported a sprinkler type irrigation system. Cropping systems listed were different for each producer.

Table 44: *Livestock types indicated as the beneficiary of the on-farm water enhancement program.*

Type	**Percentage cost-share farms**	**Average herd size**	**Average increase in herd size**
Cattle	94%	59	8
Horses	5%	25	10
Goats	2%	26	37
Sheep	1%	27	5
Poultry	0.7%	463,425	–
Other	0.3%	35	–

Conclusions—As with the major model programs, the on-farm water enhancement program investments were primarily used for cattle operations. Quality water is an essential element of any livestock operation. Two years of drought have made water issues more critical. It is unclear how the drought may have negatively impacted the improvements that were made. The Kentucky Agricultural Relief Effort (K.A.R.E.) provided further assistance to make any adjustments needed.

New pasture development and adoption of rotational grazing are enough of a benefit to justify investment in this program. Recent droughts make producers less comfortable about their water sources, and they are not willing to give up the reliability and convenience offered by city/county sources after improvement of on-farm water sources.

Recommendations—The same list of livestock types as recommended for the livestock fencing improvement program should be used for the on-farm water enhancement program. Participants answered using various forms of answers (cattle, cows, equine, horses, etc) and most did not follow the breed examples given. However, it is not necessary to have specific breeds. Those reporting tend not to give breeds or, if mixed, tend to only list the type of livestock. A dropdown list containing major livestock types is recommended. Replacing their city/county water source does not seem to be a major reason for participating in this program and reporting of this could be dropped.

This program will continue to be significant as producers deal with drought issues and may need modifications to further assist them with drought relief.

Technology Program

(Established December 2004)

Program Goals—Improve net farm income through cost-share on technology that will improve farm operation efficiency. Impact a high number of producers affected by loss of income resulting from cuts in tobacco quota. Encourage research and science-based decisions for the management and expansion of technology-based initiatives. Assist producers already exploring the use of technology in their operations, as well as producers who are interested in exploring technology for their operations.

General Analysis of Impact—The technology program consisted of four investment areas: precision agriculture, animal data management, computer hardware and record management software, and satellite broadband. Investments of $832,143 or 0.8% of total expenditures were awarded to 563 or 0.8% of participants averaging $1,478 per project. Exact investments and the number participating for each technology investment area were not available.

Precision Agriculture

Eligible Cost-share Items—GPS monitor/receiver, GPS light bar/guidance system, GPS yield monitor, spatial analysis software/training (registration only), computer GPS hardware, variable rate application control equipment, and services related to spatial management.

Analysis of Impact—One hundred twenty-six reports were available for analysis of the precision agriculture investment area of the technology program. Average farm size was larger than for all other programs due to the nature of the cost-share items at 1,450 acres with a range of 31 to 8,000 acres. Forty-nine percent reported that they were not using precision agriculture technology prior to cost-share investment. Those reporting prior use of precision agriculture technology indicated that they were using yield monitors (44%), light bar (35%), spatial management services (13%), or other (16%) technology. There was no indication which type of technology that they were adopting through cost-share investment for comparison. When answering the question of how this technology would help/expand their current precision agriculture program, almost 80% answered with a yes rather than with an explanation. Those responding with an explanation gave various answers, but the central benefit was described as more accurate and efficient seeding and application of pesticides and fertilizers. Those reporting no prior experience with precision agricultural technology indicated that it would provide precise planting, fertilizing and spraying, expand use of GPS for mapping

and yield data recording, and provide crop insurance records. Other anticipated benefits included improve efficiency, accuracy, and cost reduction.

Much of the value of precision agricultural technology results from proper implementation. In some cases producers buy technology that after one season would never be used again. However, other producers are involved in innovative practices that would multiply benefits several times over. Lightbar technology has the potential to reduce input usage (as indicated by overlapped passes) by as much as 2-10%. The higher savings will be realized with spinner spreader equipment and with larger boom-type application machines. Automatic section control equipment has been shown to tremendously reduce input usage. One example is a producer who has an odd-shaped field where the savings were over 25%. Savings for typical Kentucky field shapes would be estimated at 10-15%. These technologies were not available early in the model programs, but more recently producers are beginning to adopt these technologies as input costs escalate. Yield monitor technology is one example where savings are variable. Many farmers will print nice maps, put them in a notebook and put them on a shelf. For them the value is zero. Others will analyze the yield maps, make decisions about management practices, and execute the changes. For them the value could be very high, especially when they find a previously undetectable problem (Tim Stombaugh, personal communication).

Conclusions—Half of the participants in this program were using the precision agriculture equipment for the first time, indicating a desire to improve efficiency. The primary participants in the precision agriculture investment area were larger producers but some producers in counties such as Taylor, Scott and Garrard also invested in precision agriculture indicating a wider acceptance and scope to this program. Value can be high, but proper use and training is essential. This may be an area were technological advancements may quickly render investments obsolete.

Recommendations—The type of precision agriculture technology purchased is needed for comparison. The large size of the average acres for those participating in this program was expected, but did not benefit analysis. One question regarding how this program would help/expand or provide economic benefit for those with prior experience and those with no prior experience is sufficient.

With the cost of inputs escalating this program is worth continued support.

Animal Data Management

Eligible Cost-share Items—Scale head, readers (panels, loops, wands, and portals), management programs (e.g. CHAPS), RFID tags purchased through KBN (e.g. CPH45 tags), and carcass data collection.

Analysis of Impact—Seven reports were available for analysis of the animal data management investment area of the technology program. The database contained responses from three questions: farm size (157 acres on average), average herd size (57) and whether participant submitted the qualifying list to the Kentucky Beef Network and received approval. One did not respond to the last question, but all others responded with a yes as expected, since this is required. No other data were reported.

Conclusions—Goals were achieved for this investment area.

Recommendations—During the agricultural agents focus group, agents reported that producers were filling out the qualifying list and submitting it to the Kentucky Beef Network, but that approvals

were often not returned. Agents requested that this requirement be dropped and that producers not be subjected to unnecessary reporting, if the Kentucky Beef Network does not follow through with approval. However, there was no indication that producers were denied funding due to lack of approval.

Computer Hardware and Record Management Software

Eligible Cost-share Items—Accounting software; tax preparation software; database / inventory management software; personal data assistant (PDA); laptop, personal computer, or other hardware upgrades; and one half the cost of participation in the Kentucky Farm Business Analysis Program.

Analysis of Impact—One hundred ten reports were available for analysis of the computer hardware and record management software investment area of the technology program. Average farm size was larger than average at 217 acres with a range of nine to 1,475 acres. Eighty-nine percent reported that they had completed a computer training course listing Quicken or Quickbooks (64%), Chaps (26%), Microsoft Excel (6%) which also included Microsoft Word in most cases, and other non-specific computer training (22%). Many producers participated in more than one type of training. Participants in this cost-share investment area described their computer skills as none (5%), minimal (29%), intermediate (38%), advanced (16%), and experienced (12%). Participants described their method of financial/farm business management before cost-share as handwritten ledger (70%), electronic/computer (23%), did not keep records (3%), and other (5%). Producers gave a wide range of answers regarding anticipated benefit but answers could be interpreted as either better record keeping (60%) or increased productivity (40%).

Conclusions—Although two-thirds described their computer skills as intermediate or better prior to training, 70% were still using a handwritten ledger and 3% were not keeping records. Better record keeping helps producers discover things about their farm business, get a better picture of their overall operation, track purchase and use of inputs on a particular enterprise, field, repair and/or maintenance generated for certain pieces of farm equipment, and helps farmers produce balance sheets, income statements, and cash flow budgets (Trimble, McAllister and Isaacs). It is difficult to assess the true benefits of record keeping, but good records are a key to determining business status and should be encouraged.

Recommendations—The number of producers using handwritten ledgers or not keeping records is low and extra effort to improve this situation is needed.

Satellite Broadband

Eligible Cost-share Items—Fifty percent of the cost of equipment and installation provided by a broadband provider not to exceed $250.00 per producer. Fifty percent of the cost of broadband service for a period of one year not to exceed $40.00 per month ($480.00 for the one year) per producer.

Analysis of Impact—There were no data available for analysis.

Conclusions—With availability of other broadband access limited and the majority of agricultural support web-based, this investment area should not be dropped unless the availability of other sources are confirmed to provide more access than anticipated. However, no participation was apparent for this investment area.

Recommendations—Questions on the reporting forms are not specific and may elicit non-specific answers should a producer invest in this area.

Avenues to encourage computer connectivity should be explored. Providing 100% of the cost of equipment and installation and 100% of the first year may be necessary to get producer to pursue this unfamiliar technology.

Timber Production, Utilization, and Marketing Program

(Established December 2004)

Eligible Cost-share Items—Timber production and management; forest products utilization and marketing.

Timber production and management includes seeds and seedlings for transplant; weed control for tree plantings, treatments before and for up to three years after planting, to control weeds including chemical and mechanical treatments and the planting of ground covers suitable for tree plantings; water and irrigation supplies and equipment; layout and construction of permanent forest roads and stream crossings for long-term management, including construction of permanent best management practices on those road and stream crossings [One Pass Practice or General Forest Management]; construction of fire lines and lanes [One Pass Practice or General Forest Management]; Timber Stand Improvement (TSI) [One Pass Practice or General Forest Management] and practices such as thinning, release, control of invasive species, site preparation treatments for natural regeneration, and pruning for the purpose of improving timber quality and growth; and fencing for forest management for the purpose of restricting livestock from woodland area, not to include plank fencing.

Forest products utilization and marketing includes timber and lumber processing equipment, sawmills, portable or stationary planers, molders and other similar processing equipment; drying equipment and facilities including equipment for dry kilns, pre-dryers, dry sheds, air drying yards; and transportation and packaging equipment (excluding motorized vehicles) plus standard cost-share items.

Program Goals—To develop new revenue sources for farmers through growing and utilizing existing and new natural resources; to promote timber production and processing on rural lands and areas of farms not suitable for crop or livestock production; and impact a high number of producers affected by loss of income resulting from cuts in tobacco quota.

Analysis of Impact—The timber production, utilization and marketing program had investments of $110,166 or 0.11% of total county model program expenditures with 36 or 0.05% of participants averaging $3,060 per project. Twenty-nine reports were available for analysis. Average farm size was 213 acres with a range of 60 to 1,124 acres. Sixty-one percent reported that they were not in the timber business prior to cost-share investment. Answers varied concerning the type of operation and were non-conclusive. Average gross sales before cost-share were estimated at $32,279, but were projected to increase to $35,216, a difference of $2,937. Production levels before and after cost-share were reported in various units and were non-conclusive. Producers marketed their timber products wholesale (46%), through on-farm sales (38%) and through other means (15%) before investment, but projected that they would favor on-farm sales (65%) after investment.

Conclusions—The timber production, utilization and marketing program attracted more new producers than current producers. Although few producers participated in the timber production program, it may not have been offered in many counties. This is an underutilized resource that many producers have but dont manage or consider as an asset.

Recommendation—Participation in this program should be encouraged.

Shared-use Equipment Program

(Established December 2004)

Eligible Cost-share Items —**Forage improvement**–no-till drills, pasture renovators, silage wrappers or baggers, in-line bale wrappers, pasture aerators, and round bale wagon; **cattle handling**–scales, chutes (loading, squeeze), crowding tubs, corral panels, and head gates; **goat handling**–portable corral pens, alley way, head chute and scale; **horticulture**–bed shaper, mulch/trickle tube layer, vegetable transplanter and plastic remover / plastic roller; **others**–tree planter, lime spreader for use on steeper ground, trailer for transporting shared-use equipment, thistle sprayer and compost turner.

Program Goals—Impact a high number of producers affected by loss of income resulting from cuts in tobacco quota; reach farmers who cannot justify ownership expenses associated with certain equipment; provide counties with limited resources options to serve a greater number of producers than other programs may allow; and help producers access technology necessary to improve their operations in an economical manner.

Analysis of Impact—Fifty-four counties reported participation in the shared-use equipment program with the majority (36) reporting multiple items. The total expenditure from ADB for 2001 through 2007 was $1,125,985 with over 140 items reported by counties (some items contained multiple parts such as cattle handling equipment). Until recently 100% of the cost was supplied through the ADB with a 50% cost-share required at the time of submission. Therefore, additional total cost supplied by counties is not available, but is substantially less than that of the investment by ADB. Exact numbers are difficult to generate due to the number of years encompassed by the program and the self-sustaining nature of how most counties are administering the program. Fees charged to producers for the use, in some cases have generated enough revenue to buy comparable equipment while maintaining the initial equipment.

No-till drills or seeders are the most common type of equipment with 47 purchased in 34 counties. Twenty-six hay wrappers were purchased by 18 counties. However, some of those were purchased from generated revenue and not initial investments. Fifteen counties purchased 18 lime spreader buggies primarily to provide producers with access to steep ground. Fifteen counties purchased 17 sets of cattle handling equipment including, chutes, scales head gates, and panels. Seven counties purchased eight sprayers including one built for an ATV in Floyd County where terrain is more challenging. Four counties purchased vegetable production equipment including bed shapers, transplanters, and plastic layers and lifters. Four counties purchased five renovators; three purchased small livestock scales; three chain harrows; three purchased post drivers; two purchased manure spreaders; two purchased tree planters and two purchased posthole diggers. Other shared-use equipment included an ATV gravity feed spreader (also purchased by Floyd County for the same

reason as stated for the sprayer), a bale transport wagon, a conventional seeder (the county already had access to a no-till drill), a goat head catch, an instrument for checking breeding soundness for bulls (used by the local vet), a silage baler, a hay probe, a straw blower, and a no-till tobacco transplanter.

Typically, counties who bought more than one no-till drill opted to get at least one small and one large size drill. This gave producers more options and allowed those with smaller horsepower tractors to reap the benefits offered by improved forages. For those who only have a few acres to seed per year, the cost of owning is prohibitive. No-till drills reduce fuel consumption by removing the field preparation requirements of conventional seeders, reduce erosion on steep slopes, save time by reducing the trips across the field, and may improve carbon sequestration by increasing organic matter. By purchasing multipurpose drills producers could seed hay fields, renovate pastures or seed grain fields. Comments received from agricultural agents regarding the success stories from shared-use no-till drills include the following: "2,003 acres have been drilled by 90 landowners"; "there is such a demand for this type of equipment [even with] five units and there is still a waiting list"; "30 farmers used it last year and it is booked solid this year [and it is] expected to cover about 1000 acres"; "past two years, 61 farmers have seeded or renovated"; and "acre meter indicates that the drill has covered over 3,537 acres."

Hay wrappers improve hay quality by allowing producers to bale hay under less than ideal conditions. Negligible dry matter loss occurs due to the ensiling process and wrapping reduces considerable dry matter losses that occur during normal handling of hay (18% on average) for conventional baling (Jimmy C. Henning, Michael Collins, David Ditsch, and Garry D. Lacefield). Some producers have seen such a significant benefit that they purchased their own wrapper or shared one with a neighbor. One county reported 5000 bales wrapped annually.

In most cases agents said that lime spreaders added accessibility to fields in their counties that previously were too steep for lime trucks to reach, improving productivity of pastures in those fields by improving soil pH. They also mentioned issues such as convenience, scheduling, and cost saving through bulk purchases.

The benefits for the cattle handling items did not differ from that of similar items reported under the cattle handling model program and will not be discussed here. Some producers who used the shared-use cattle handling equipment saw the benefits and purchased their own with cost-share help through the cattle handling program. Vegetable equipment was used for demonstration purposes and allowed those with interest a chance to try vegetable production without the initial startup expense.

Benefits of other equipment are as expected.

Extension Agricultural agents promoted the benefits of shared-use equipment through demonstration, newsletters, and Extension publications.

Conclusions—The shared-use equipment program may have produced the most significant impact of all the county model programs. For the most part it is self-sustaining through the assessment of rental fees. Many counties have generated enough revenue to purchase new equipment while maintaining existing equipment. Many counties not using this program are missing out on the improvement in production practices offered by shared-use equipment. However, finding an organization within a county willing to administer the shared-use equipment may be a limiting factor.

Concern regarding liability, time administering the pickup, delivery and inspection of the equipment, and the collection and accounting of the fees assessed may prevent some county groups from assuming the responsibilities.

Recommendations—The 50% cost-share requirement should be reconsidered. This requirement violates shared-use equipment objective three which states that this program should "provide counties with limited resources options to serve a greater number of producers than other programs may allow". Limited resource counties may not be able to generate the required 50% match.

Summary

County model programs have been highly successful in improving producers knowledge, farming operations, and net returns. The program was designed to reach a maximum number of former tobacco producers and was highly successful in achieving that goal. Counties have contributed by imposing guidelines to distribute funds to as many producers as possible. County councils were given autonomy to choose the types of programs that best served their counties. However, the primary area of emphasis has been the beef industry which has benefited either directly or indirectly from approximately 70% or $70 million of the cost-share funds invested by the ADB. Producers have moved from a high dependence on tobacco to a high dependence on beef cattle. Any downturn in the beef industry could have devastating consequences for some producers and the agricultural economy of the Commonwealth.

Significant growth in production knowledge and implementation of improved practices on producers farms can be attributed to six program areas: forage improvement and utilization; cattle genetics improvement; cattle handling facilities; hay, straw, and commodity storage; farm livestock fencing improvement; and on-farm water enhancement. While ADB and producers investments are the most significant contributing factor to the growth, educational programs and investment guidelines that required improved practices cannot be ignored. Not only have the county model programs bolstered the infrastructure of Kentucky agriculture, it has provided the knowledge base for producers to make informed decisions as input costs, production and demand are influenced by weather, the economy, health issues and consumer preferences.

Since the majority of the funds distributed were for a few programs, many participants are approaching investment caps. Considerable thought should be devoted to how future funds will be invested as numerous producers reach the investment caps. If caps are impediments to future progress, are they in the best interest of the agricultural community? An example of this problem can be seen in the cattle genetics improvement program where many producers are reaching the $5,000 cap for bull/semen purchases. The cattle genetics improvement program, in the opinion of many, inflated the price of high quality bulls by up to 100% of the price before the program. As producers reach the investment cap for participation they will have to purchase future quality bulls in an inflated market or regress to the inferior bulls purchased prior to the program. While the numerous benefits of using a superior bull should be evident, it is feared that some of the advancements that have been realized could be lost. While removing investment caps is not advised, close evaluations are needed to make sure that current levels are not restricting producer advancement.

As those caps are reached by beef producers creating less of a demand for investments in the major programs, there will be a need to shift those funds to other programs. However, it is unclear as to how much of those funds can be utilized by producers looking to diversifying into other commodities. While there have been numerous examples of programs that have had significant success, the degree of involvement is still relatively small in comparison to that of beef cattle.

Some programs billed as diversification programs are clearly not generating new producers or establishing new marketing options. The nature of the commercial poultry, swine, and dairy industries do not provide the right environment to entice many new producers or provide other forms of marketing or production diversification. They are viable programs but should not be billed as diversification programs.

The equine, goat, fruit and sorghum, vegetable, mushroom and herb, commercial ornamental horticulture, and pasture poultry and other fowl are effective programs and have contributed to the diversification of producers in Kentucky. Agri-tourism, certified/commercial kitchens, greenhouse conversion/construction, honeybees, rabbits, sheep, technology, and timber programs have made modest contributions, but aided few producers. In some cases, access to the programs may be an issue. An example is the certified/commercial kitchens which has tremendous potential, but has been utilized by only a few producers in a few counties. These programs need re-evaluation to determine ways to improve access or increase participation.

Commercial aquaculture, sod production, and satellite broadband have had little success and these programs need re-evaluation to determine ways to promote the programs and to increase participation. However, if there is little demand for programs like sod production, then those should be dropped from the program.

The shared-use equipment program may be the most successful program of the county model programs. It provides producer access to equipment that they could not otherwise justify purchasing, allowing them the benefits without the initial expenditure. Loan fees helped generate maintenance funds and in many cases, the ability to eventually replace the original equipment. This makes the shared-use equipment program highly sustainable.

General Recommendations

The Social Security Number and Tax Identification Number should be removed, if possible. Many people are worried about identity theft, and the information is already provided on certification forms.

Attempts should be made to reduce the size of reporting forms and reduce reporting errors in the future. Dropdown menus with optional answers for questions are recommended where multiple choice answers are appropriate and would improve recording efficiency, provide uniform data that can be easily sorted, and prevent misspelling. Units expected should be included on production level question, if they are included on report forms. Farm size adds little to the analysis. Questions regarding benefits of cost-share to a producers operation are vague and are often misinterpreted by producers. The type of answer desired should be indicated. Various forms of the same answer are impossible to analyze and do not produce meaningful data.

The different programs within a program or investment area (e.g. forage/pasture/grain improvement, filter fabric pads; bulls, heifer improvement; and hay, straw, or grain) should be reported separately. This would minimize the size of individual reports and decrease reporting errors, such as data in wrong columns, commonly encountered in this analysis. Responses to operation type, what was produced, previous and projected years production levels were variable, do not provide usable data, and these questions could be dropped to improve reporting efficiency.

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